

The Sunspacers Trilogy

George Zebrowski

An [*e - reads*] Book

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Author Biography

George Zebrowski is one of the premier masters of modern science-fiction storytelling. Taking his place among luminaries such as Fritz Leiber and Arthur C. Clarke, Zebrowski has garnered favorable reviews and a significant following among readers. Educated in philosophy at SUNY Binghamton, Zebrowski is the son of Polish immigrants fleeing the chaos of Post-WWII Europe. He lived many places growing up, including Italy, England, the Bronx, Manhattan and Miami. From 1970 to 1975, Zebrowski served as editor of *The Bulletin of the Science-Fiction Writers of America*, taking up the post once again in 1983. Zebrowski has been described as the consummate science-fiction professional, as his successful writing career, editorial services and tireless work on behalf of the Science Fiction Writers of America will attest.

For Ian Watson,

*who was curious about
how it would all turn out
—and here it is!*

Table of Contents

Sunspacer

[Chapter 1](#)

[Chapter 2](#)

[Chapter 3](#)

[Chapter 4](#)

[Chapter 5](#)

[Chapter 6](#)

[Chapter 7](#)

[Chapter 8](#)

[Chapter 9](#)

[Chapter 10](#)

[Chapter 11](#)

[Chapter 12](#)

[Chapter 13](#)

[Chapter 14](#)

[Chapter 15](#)

[Chapter 16](#)

[Chapter 17](#)

[Chapter 18](#)

[Chapter 19](#)

[Chapter 20](#)

[Chapter 21](#)

The Stars will Speak

[Chapter 1](#)

[Chapter 2](#)

[Chapter 3](#)

[Chapter 4](#)

[Chapter 5](#)

[Chapter 6](#)

[Chapter 7](#)

[Chapter 8](#)

[Chapter 9](#)

[Chapter 10](#)

[Chapter 11](#)

[Chapter 12](#)

[Chapter 13](#)

[Chapter 14](#)

[Chapter 15](#)

[Chapter 16](#)

[Chapter 17](#)

[Chapter 18](#)

[Chapter 19](#)

[Chapter 20](#)

Behind the Stars

[Chapter 1](#)

[Chapter 2](#)

[Chapter 3](#)

[Chapter 4](#)

[Chapter 5](#)

[Chapter 6](#)

[Chapter 7](#)

[Chapter 8](#)

[Chapter 9](#)

[Chapter 10](#)

[Chapter 11](#)

[Chapter 12](#)

[Chapter 13](#)

[Chapter 14](#)

[Chapter 15](#)

[Chapter 16](#)

[Chapter 17](#)

[Chapter 18](#)

[Chapter 19](#)

[Chapter 20](#)

[Chapter 21](#)

[Chapter 22](#)

[Chapter 23](#)

The Sunspacers Trilogy

Book 1

Sunspacers

1

Getting Ready

Jupiter ballooned into view on the south wall of the cafeteria. The voyaging eye of the 3-D motion mural sailed by the giant planet, rotated gracefully to peer at a few major moons, then fixed its gaze on the long way to Saturn.

Chico Fernandez's tour loop of sunspace made the basement level of Bronx Science/De Witt Clinton Commons into something like the brightly lit observation deck of a giant spaceship, but no one paid much attention. After you've rushed out from Mercury to Pluto a few times, the endless round trip begins to bore most people, despite the whip turns, long looks, and sudden speedups near the planets.

I looked at my empty bubble of nonfat milk, wondering if I wanted another, maybe with apple pie. There wouldn't be much time for me to talk to Morey Green-Wolfe before our two o'clock physics class. He was late, as usual, and I felt irritated.

Home screens had been scrambled from May 15 to June 17, so classes would meet in person. High school students were usually brought together in January, May, and June, but graduating seniors could get away with only a month of staying together. Screen attendance made people shy, some educators claimed, but I had my doubts. It was true that there were sponges who liked to stay home and plunder the world's libraries at their own dizzy pace, but I knew of too many people who had met over the screen hooks to believe that becoming friends in that way was all that hard to do, or very harmful. Some people preferred to start out over the net. They would meet sooner or later, or not at all, but the system made it easier for shy people to get to know each other in the first place, without much chance of things going wrong. It was more like having an old-fashioned pen pal, except that the notes and letters were sent differently and more quickly. Still, I guess some of the hard cases among shy people needed to be thrown together. I knew there were adults who owned 3-D holos and who rarely met in the flesh. But those people were usually up to a century old or more, and wanted to cultivate their privacy. They had lived into our time from the last century, and their bodies had been renewed at least twice through organ clones and cell regeneration, so they were a special case.

I stood up from my seat at the end of the long table and spotted Morey's broad shoulders near the north exit. He pushed through the outgoing crowd and came across the room, adjusting his collarless tweed jacket and brushing back his dark brown hair.

"Sorry, Joe," he said loudly as he slipped in across from me and shook his head. "Old Lyons and super gravity. He doesn't seem to know—" He gave me a blank look as I sat down. "What's wrong?"

"You're late and I wanted to talk."

He glanced at the wall timer. "Sorry. You have your acceptance letter?" He bit his lower lip. "Look, I said I'm going. It's all set. Your parents still edgy about it? You know they can't stop you." He was looking right at me. "What is it—you don't want me for a roommate?"

"It's not that. I've been wondering."

He examined me with his steel-blue eyes. I looked down at the table, feeling foolish. "I guess I'm worried about going off-planet to college."

He sighed. "It's the best school we could get into, one of the best anywhere."

"It's the idea of actually going away from everything, outside the atmosphere ..."

"Nothing to worry about." He seemed a bit surprised. "You know what it's like out there. Space won't bite you."

"Knowing is one thing, feeling another."

He shook his head. "No. You're spooking yourself. You're just apprehensive about leaving home."

"Maybe that's it." I felt silly, especially after all the convincing I had gone through with my parents. A part of me was uneasy while the rest of me was looking forward to the change. It was hard to admit that I wanted to get away from my parents. "We're late," I said.

"Forget it—we've got the grades." He looked around. "I'll be glad to leave this place."

"It's not so bad," I said feebly.

A tray crashed to the floor. Morey gave me a bored look as the cheers started. "Screening is better than this."

"You've got to keep up your social development."

"With this herd? I'd probably go into shock if they didn't cheer!"

I knew how he felt, but the noise had calmed me down. As I glanced around at the faces, I realized that most of the students didn't seem to demand much from themselves. They were looking forward to the moment when they could freeze their educations and be ready for job slots with guaranteed vacations. I said I wanted a scientific career, but Morey seemed to want one more than I did. Sure, I liked physics and astronomy, but I could probably live without making some giant discovery. Morey wanted to explain the whole universe.

"What else is there worth trying for?" he liked to ask. "We know a lot, but it's still a mystery." I felt like an outcast for not quite being able to see what he meant.

"Feeling better?" he asked.

"Yeah, I guess."

Morey laughed. "Old Lyons is five years behind in astrophysics, maybe ten." It might just as well have been a hundred, I thought.

"Might as well check our math presentation," I said, taking out my flatscreen and thumbing up the problems. The display insisted on presenting a flicker of random numbers, so I wiped it with a pass of my hand and looked up.

Marisa Granville was standing behind Morey with two of her friends. Willow was in my English class; Corazon was a new girl from Jamaica.

"So you're going," Marisa said, staring at me with her green eyes.

I nodded.

"Out there."

"Yeah."

Morey swung his chair around. "What's so unusual? People have been leaving the planet for almost a century."

Marisa took a deep breath. Corazon shrugged; Willow smiled. I squinted at Morey, to warn him off; the conversation was going to be about something else, and I didn't want him in it.

"You think you're better than the rest of us," Marisa said. "Earth isn't good enough for you."

Corazon frowned. Marisa had not come to say good-bye, as I had hoped. She was still angry about my leaving.

"You obviously think it's glamorous," Morey said. I tensed, wishing that he would shut up.

Marisa was looking at me as if Morey were invisible. "I don't really care," she said. Willow smiled nervously, reminding me of the times she'd acted as go-between when Marisa and I'd had fights.

"Don't you know *anything*?" Morey asked, and I felt sorry for Marisa. Morey's critical tone was enough to freeze the oxygen in the air on a summer day. He knew how to ask questions in a way that destroyed the possibility of any answer, much less a reply that would interest him.

"Spacers think they're special," Marisa shot back. "Why do you want to go among people who think we're only bugs crawling around on the outside of a mud ball?"

I knew it was all just talk that she'd picked up, that she was trying to get around to something else, but Morey just wouldn't let go, so maybe he deserved it.

"The mud's in your head," he replied. "Earth can't do without the power and resources that the Sunspace colonies provide. Maybe you need a dose of memory fix."

He was right, of course. I thought of the miners on Mercury. They were having a tough time getting what they needed from Earth, even though they gave Earth all the metals it needed. But this was not the time to discuss Earth's political problems.

"Joe, can I talk to you alone?" Marisa asked. Willow led Corazon away.

Morey finally caught on. "Uh, I'm going to get something to drink." He got up and left. Marisa slipped into his seat.

"You're not like him," she said softly. "So why are you going?"

"I want to be a physicist. It's the best school for it."

She didn't seem to believe me. I had wanted her to tell me that we were still friends, even if we had to go our separate ways. But she seemed to think that I was making a big mistake of some kind. She had never

liked anything I was interested in, and she still didn't like Morey.

"It's not you," she said.

"What does that mean?"

"You don't understand, do you?"

"So tell me. You're not very clear about it." All I could see was that she didn't want me to go.

"You're too wrapped up in yourself to listen."

She was making me angry. "Look, I can be what I want."

She gave me a hopeless look as she stood up. "Well, I hope you'll both be very happy out there." She turned and bumped into Morey, then walked away.

Morey sat down. "Thanks," I said. "You really helped."

"It's all in knowing how to read weak minds," he announced stiffly, as if he were a million years old.

"Marisa's mind isn't weak. She just wants different things, that's all." I was suddenly impatient to leave. One more week and it would all be over.

"Sorry," Morey said. "You should have seen the look I got. She still cares about you, I bet."

It wasn't fair of Marisa to stir me up again. I hadn't seen her in three months and thought it was all over, but I could see why she had done it. This had been her last chance to get me to see myself her way. I felt guilty and relieved at the same time. I didn't care; I couldn't care—I was leaving.

"She didn't have to put down Sunspacers," I said, remembering the recent news stories about how many miners had died over the years in the quakes on Mercury.

"Just a handy needle to stick you with," Morey said. "I doubt she knows much about the politics. Earth's dependence on off-planet power and industry is making a lot of politicians hysterical, and they pass the feeling on to the populace. They hate the idea that a new civilization is growing out there and Earth is no longer everything."

"She was talking about other stuff."

"I know, that's what I meant. Where is she going?"

"Hawaii, I think."

He shrugged. "It's not known for anything besides some history."

"I don't think she got in anywhere else."

"What's she going to do?"

"Art, I think. Who cares?"

"She's not too happy with herself, so she came over to pick on you."

"Yeah, I know." She still wanted me to be someone else, and for a moment she had made me feel that I didn't know myself at all. I didn't like the feeling.

"How are your parents?"

"They seem to be getting along." Morey was beginning to irritate me. "Time to go home." I stood up and clipped my flatscreen to my belt. "See you tomorrow." There was no way I would be able to concentrate on two o'clock physics.

A plate clattered somewhere as I made for the exit, and the cheering started up again.

As it got closer to graduation, I began to suspect that Mom and Dad would not be back in time. They hadn't been home during the last week of school. Dad had taken a leave from his job at the Institute and followed Mom to Brasilia after their last fight, on the day their marriage contract had come up for renewal. This bothered me in ways I didn't want to examine, so I tried to push it away.

I went to the exam terminals for five days of tests and got my A's, but there was little fun in it, even when I got the scholarship. I would have had to get double A's, if there were such a thing, to impress my parents or advisers. I knew one thing, though—I had to work much harder than Morey.

On the night before graduation, I was eating dinner alone again. There had been no calls or messages. I didn't even know if invitations had gone out to relatives. The only good thing about it all was that it kept me from thinking too much about Marisa. Cruel as it may sound, I had wanted her to fade away in my mind, but her talk with me in the cafeteria had made getting over her harder.

I got up and walked over to the window in the living room. The lights of Manhattan were blurry in my eyes. Maybe my parents would be back late tonight, I thought as I began to pace. I stopped after a moment and looked at the empty chairs around the triangular table in the dining area. The old-fashioned three-bulb chandelier seemed to be hanging at an angle. I hadn't eaten much of the tuna and crisp bread I had prepared. The split of white wine was unopened.

I looked out the picture window again, and saw myself in the dark glass. Suddenly, I was surprised by the fact of being *me*. Dad had once told me that the sensation would fade as I grew up, but I still didn't see how that could happen. I was separate from other people, locked up in my own skull, unable to enter their heads any more than they could invade mine. So how could Marisa know me better than I did? But maybe she knew enough; after all, I knew Mom and Dad, and cared about them, even if I didn't know *everything*.

The person staring back at me from the night seemed thin for five eight. His muscular arms were pale in the sleeveless blue shirt. He stooped a bit, and some of his light-brown hair fell over his right eye. His lower half faded away into the city rights.

—Why should I bother going to graduation?

—You were looking forward to it.

—No big thing. College is more important.

—Morey will expect you.

—He doesn't need me to graduate.

—But he's your best friend.

Maybe that was the only reason I was going off-planet to school. That and to get away from my parents. I was sick of them not getting along. So I would have to work a bit harder than Morey—so what? I would see a new way of life, human beings building new worlds among the stars. If it meant studying

physics for a career, then I would do so. I was looking forward to being on my own, to not having to worry about anyone else for a while. I needed a big change, and this was going to be it.

I stepped closer to the window, feeling a bit lost; the floating figure disappeared.

[|Go to Table of Contents](#) |

2

Graduation

I got up the next morning, put on the one-piece blue corduroy suit Dad had bought me for the ceremony, and rode the boost tube up to the Educational Center on 210th Street West. It was almost 10:00 A.M. when I arrived on level two above the street and came out into a hot, sunny day.

I felt lost as I looked out over the emptiness of the giant square around the hundred-story pyramid. Its east face caught the sun with a million windows, giving the structure the appearance of a cheerful ornament, but I wasn't in any mood to appreciate it. Maybe Mom and Dad had shown up at the last minute and were waiting inside. I would have missed them if I hadn't come, I told myself.

I wandered down the ramp and marched across the deserted square, working up a sweat by the time I reached the main doors. They slid open and I went into the lobby, loosening the stick seal on my collar as I looked around at the crowd.

I turned and saw Morey with his parents.

"Good morning, Joe," Mrs. Green-Wolfe said. I noticed some familiar faces behind them, but everyone was so dressy I couldn't be sure.

I nodded absentmindedly to Morey's mother. She always seemed to be smiling as if she knew some silly secret.

"Where's your folks?" Mr. Green-Wolfe asked loudly. Nearly everything he said sounded as if he were asking you whether you wanted a dessert. It was obvious where Morey got some of his manner from, except that he was smarter than his father.

I continued scanning the crowd. "Oh ... they're here somewhere, with some relatives, I think. They were coming back late from a trip," I added, preparing the excuse I might need later.

"Your dad's a sharp econometrist," Mr. Green-Wolfe said, looking around as if he expected to get some business advice from him. "Your mother is a charming woman," he added. "I'll be so glad to see her again." He put his arm around my shoulder. "Do you think you boys will be able to stand sharing one dorm room together?"

"Sure," I managed to say, realizing that my parents weren't here. My face was flushed, and I felt cheated. Suddenly all their excuses from other times added up into one big pain. I took a slow deep breath and tried not to show it, but it hurt just the same.

"Good!" Mr. Green-Wolfe said. "You two are real pals." The time came to go into the auditorium. Scholarship winners sat together near the front, so I just tagged along automatically after Morey, not paying much attention to anything as we took our seats. Parents sat in the balconies, like elder gods gazing down on their creations. Maybe Mom and Dad were up there, but I was afraid to turn around for even a quick look.

Holo cams cast 3-Ds of speakers and students above the stage during the ceremony. Havelock "Burning Bush" Bearney, our red-bearded principal, delivered a dull talk about brains and courage and leadership, though he seemed to want us to opt for cooperation if we couldn't be leaders. Toshiro Saada, the class president, whispered a speech about sacrifice that seemed to exalt self-punishment. Elene Chen, valedictorian and math prodigy, gave a vague but well-organized address on setting your mind toward the right individual goals. My mind wandered as our names were read out in reverse alphabetical order.

"Joseph Sorby!"

My name echoed through the auditorium. Morey nudged me when I failed to react.

I went up to get my diploma, sleepwalking all the way. A giant image of me gazed at the blue ceiling as I marched up and took the tube of silvery plastic from "Burning Bush" Bearney. He shook my hand and grinned at me with threatening teeth. Strangers applauded for me as I went down on the other side. I imagined Marisa making fun of me from her seat among my nine hundred classmates. Morey clapped me on the shoulder as I sat down, and that made me feel good, but I was still anxious to get it over with.

We finally marched out into the lobby. The doors slid open as the picture taking and gift giving began, and the whole show pushed out into the glare of the noon sun. No one noticed as I slipped away toward the station.

The tubeway boosted me down to 125th Street in a few minutes. I changed for the local and floated over to West 87th. Anything would have been better than going home just then; I was mad and getting madder by the second.

A cool breeze was blowing through Central Park when I came up to street level and started down the block to our housing complex. I came to our outside elevator doors and pressed my palm on the print lock. The doors slid open, and I stepped inside, feeling apprehensive as the elevator climbed the side of the building. I would be angry if my parents were home, angrier if they weren't. The breeze rolled the tops of the trees in the park. Afternoon sunlight cast sharp shadows between the tall buildings. The elevator rushed to the ninetieth floor, and the inner doors opened.

I hesitated, staring southward to the blue ocean beyond lower New York. Finally I turned away and went inside, wandering slowly down the brightly lit hallway to our apartment.

Queasiness flooded my stomach as I thumbed the lock plate. I didn't know what I was going to do or say if they were home.

Mom jumped me as the door slid open. "I'm so sorry, dearest!" I tried to step back, but it was too late. "We just got back." She hugged me.

"Missed a connection," Dad said.

"Sure," I mumbled. My arms hung at my sides.

"Congratulations," Dad said.

Mom was looking into my eyes. Her black hair was piled on her head in a strange swirl. Her face was pale, sad, without makeup, and her eyes were slightly red.

They had tried to get back, a part of me said, but I wanted to hurt them for making me feel like nothing, even though I could see that they had already been hurting each other.

"There are messages for you," Dad said as I pulled free of Mom and went past him into the living room.

"Thanks, I said coldly, suddenly grateful for something else to do. I sat down by the phone and pressed in my thumbprint. The wall screen lit up with my first message:

MR. JOSEPH SORBY:
PLEASE REPORT JULY 1, 2056,
BERNAL HALL, DORM ROOM 108,
O'NEILL COLLEGE,
DANDRIDGE COLE UNIVERSITY AT L-5.

—*OFFICE OF THE DEAN OF STUDENTS*
JUNE 21, 2056

The second message appeared:

DEAREST JOE: [FLASHING LETTERS]
CHEERS FOR OUR FAVORITE
GRANDSON! WE CALLED EARLIER.
HERE'S SOMETHING TO HELP YOU
ON YOUR WAY, RIGHT INTO YOUR
NEW ACCOUNT #000-112-2-34789.
WE'LL CALL YOU WHEN YOU'RE SETTLED
AT SCHOOL. LOVE,

—ANTONIA AND JOHN SORBY
LONDON, JUNE 21, 2056

"Can I see?" Dad asked. The message flashed three times and blinked off. "Oh—is there anything from your mother's parents?"

END OF MESSAGES

I ignored him. The screen went dark.

"There will be one along," Mom said, sitting down on the arm of my chair. "I told them."

"Don't," I said as she touched my shoulder.

"We love you very much," she said with difficulty, leaning back next to me and closing her eyes. I remembered playing with her when I was small, sitting on her belly and shouting for her to surrender. She still seemed as beautiful, but she wasn't the same person.

There was a long silence. Dad stood nervously in the center of the room, as if waiting for something.

"Your mother and I will be separating," he said finally. "Sorry to have to tell you now."

Mom sat up and looked at me. "We waited until you were ready for college."

"Why?" I demanded, feeling my anger rising again. "So it would be easier on you? Maybe you were planning to leave me a message about it?" It was obvious to me that they were still concerned solely with each other, and I was just another obstacle.

"You're older now," Mom said, ignoring what I had said. "You're ready to be on your own. The marriage contract happened to expire now. You can understand that."

I looked at Dad. He seemed lost. I wondered again why he had been so opposed to my going off-planet to school. Maybe he had thought that if I had gone to Columbia or NYU, it would have helped keep the marriage together.

"When you come home," Mom continued, jumping past any consideration of my feelings, "you'll come here for part of the time, and to your grandparents in Brasilia, until I get a place of my own there. Eurico and Agata were very excited when I told them you would visit them."

"We'll always be here for you," Dad added tiredly.

Mom let out a deep breath, and I could tell that she was relieved. Dad wasn't about to start arguing again.

"When do you have to leave?" she asked me. Her lid was on tight, and nothing was going to blow it off.

"About ten days," I said, struggling to control myself.

Dad slumped down in the sofa. "How was the ceremony?" He was emotionally drained and physically exhausted from the trip. There was no fight left in him, and I saw my chance.

"Pretty boring. You didn't miss much." I tried to sound as sarcastic as possible by putting myself into Morey's million-year-old man mood, but it went right past them.

"We should have been there," Mom said sternly as she stood up. She looked thinner in her slacks. "We know and we're sorry. You don't have to excuse us." She sounded as if she were talking about some other people.

Dad was looking down at his feet. "Nothing can excuse it," he said as if he were speaking to Mom. I might just as well not have been in the room. "We'll make it up to you..."

"Sure—how are you going to do that?" I demanded, feeling crushed. "You don't listen to each other or to me. It was shitty of you not to make sure that you would be back in time. You could have done that! Do you hear me?"

Dad looked at me in surprise. *You don't need us anymore*, his eyes seemed to suggest, *so it doesn't matter what you say*. Well, maybe he wasn't thinking exactly that, but I was sure that he had no energy left to worry about me or my feelings. A small, distant part of me wondered if I had ever listened enough to understand their problems; but it was too late for me to care. In ten days I would be free.

"You probably didn't have any breakfast," Mom said.

"I'm not hungry."

"I'll make lunch," Dad said as he got to his feet. I sympathized with him for a moment. Why should he bother listening to me, or facing up to anything, when in two weeks we would all be apart?

Clouds covered the sun in the window, and we became shadows in the pale daylight. Mom followed Dad into the kitchenette. I watched them going through old, familiar motions, and remembered those times when I had felt warm and secure, knowing that little would change for a long time to come, and maybe never. Those bright, endless afternoons seemed far away now. An awful fear rushed through me. In a few years Mom and Dad would only be people who had once been parents. Would we like each other as adults? There was no way to know, so I tried hard not to care, and pushed the problem away.

Mom swore as she dropped something. I heard Dad take a deep breath. "Eva ..." he started to say.

"Don't begin, John," she shot back. There was a long silence, as if they were standing perfectly still.
"Joe!" Mom called to me. "We'll have lunch in here on the counter."

The sun came out and filled the room with light. I got up, realizing that not much would have been different even if they had come to graduation. I would still have wanted to get away. Their problems were not about to disappear overnight, and my being around wouldn't help much.

"Joe?" Mom called again.

"Coming," I managed to say. Maybe we all needed to lose each other for a while.

[|Go to Table of Contents |](#)

3

Going

"Are you very sure?" Mom asked me.

"I'm sure," I answered without looking at her. It was almost time for me to go. I knew that they were relieved about my going, but it made them feel guilty, so they were repeating their old questions to make themselves feel better. I had gotten my way because they were too wrapped up in their problems to worry about me. If they had tried to force me to go to college while I lived at home, I would have complained against them under the Youth Rights Act of 2004.

"It's what he wants," Dad said as firmly as he could, more to settle Mom down than to support me. *And you'll be stuck with however it turns out* . He didn't say it out loud, but it was there in the tone of his voice.

We wandered toward the door. Mom held her hands together and tried to smile. "Are you sure the scholarship will cover everything?"

She knew it would, so why was she asking again? I had to admit that it couldn't just be guilt. She cared about me, as much as she could, I realized. "He's had expert help in the choice and planning," Dad said, standing there, hands deep in his loose pants.

Mom looked at him, then at me, unable to speak.

"Just a kid," Dad muttered. "Sitting on my arm only yesterday."

The lump in my throat surprised me as I picked up my small bag.

"All set with your trunk?" Dad asked in a quavering voice.

"Three days ago," I croaked. "You were here when they took it away."

He gave a strained laugh. "Right."

Mom sniffled, ready to cry.

"Well, good luck, son," Dad said loudly and held out his hand. It was no time to think or make judgments. I shook it and tried to smile, then gave Mom a long kiss on her wet cheek. Slowly I turned away.

It took forever for the door to slide open.

I walked down the hall to the open elevator, stepped inside, and turned around to look back. Dad had his arm around Mom, and suddenly I wished very hard that they would solve their problems and stay together.

"Sure you don't want us to come to the airport with you?" Mom called out.

I shook my head. They waved as the door closed, and I dropped toward the street, feeling lost and alone, disliking myself for being so soft as I held back tears.

Thoughts of Marisa distracted me as the subway shot through the boost tube. I had liked her loops of the old Grant Wood landscapes—the leaves fluttering on the trees, the grasses waving, the sun shining into farmhouse windows, the clouds moving in over the horizon like the black soles of a giant's shoes, the rain and lightning flashes. She could create her own animations, good enough to display in shows, not just for covering walls and windows in apartments. Maybe there was a good art school in Hawaii.

Local stations flashed by in the darkness. I tried not to think. "You imagine that you've swallowed every mind around you," Dad had once said, "but there's a lot you don't know." I had felt angry that he should be critical of me for wanting to know things.

"Maybe not all," I had replied, "but much more than you." He had looked at me with his dark brown eyes, and I couldn't tell whether he was going to laugh or cry. I felt guilty thinking about it. It seemed now that I had expected him to know everything, and had been disappointed when I found out otherwise. I should have told him how excited I was about the things I was learning; and he should have taken more of an interest in what I was doing, shown more appreciation, something he had never done. I realized now that he felt bad about it, that he knew his chance to have been a better father was gone, but it was too late.

Memory is a bridge to the past, and to the future. Each of my earlier selves had been looking forward to me, pushing me across that bridge as I worked to do what they had only dreamed; but I had to build each section of the bridge as I went, just to have a place to go. What worried me was that I couldn't see myself on the other side. Maybe no one could do that, because the bridge was everything, and we all betray our past selves.

Who was I looking forward to being? Suddenly I knew what I was afraid of: I would be making my own mistakes now. Mom and Dad had made quite a few. Who was I to think that I would do better? But I had to do better, I told myself. It was a pact I had made with my earlier selves. I would never forget anything, and that would make the difference.

Then it hit me again that I was leaving *everything*, my parents, New York, Earth. Nothing would be the same again.

The boost train glided into Kennedy-Air and slowed to a stop. I sat there for a minute, getting a grip on my fears and doubts.

Morey boarded the shuttle from New York to Brazil's Equatorial Spaceport and marched down the aisle to where I sat, about halfway in.

He sat down roughly, nudging me with his elbow, but I was glad to have a friend going with me.

"I'm happy that's over," he said. "My parents wanted to come down to the spaceport with me. I had to talk them out of it. They came down here, though. Sorry I'm late."

"That's okay, you made it."

We fastened our seat belts and watched the small screens on the backs of the seats in front of us. The shuttle began to move. Towers, hangars, the hotels and swirling walkways of Kennedy-Air rushed by as endless routine.

We went up, climbing until the sky turned deep blue. A hundred and ten kilometers up, the craft turned off its engines and glided south. I'd been on air shuttles before, but the moment of engine shut-off always took my breath away.

Stars burned in the purple-black over Africa as we whispered toward the equator, and the curving horizon made me feel the smallness of the planet. I was used to thinking of New York State as a suburb of New York City, but at this altitude a shuttle could reach Cairo, or any city on the globe, within an hour; you had to leave the planet to go anywhere far. Soon now, I realized, I would get a taste of *real* distance for the first time—from here to the Moon's orbit; and yet that was a local run compared to interplanetary distances—to Mars or Mercury, for example.

I touched a control on my armrest and called up a view of deep space. People lived out in that black sky—on the Moon, Mercury, Mars, in the Asteroid Belt, and on the moons of Jupiter and Saturn; two million in the Bernal Clusters alone, more in the O'Neill Cylinders of Sun Orbit, not to mention the ten thousand dock workers of the asteroid hollow in High Earth Orbit, where the giant artificial caves served as berths for the massive interplanetary ships.

I dreamed of faraway worlds with strange skies. Domed cities on Mars and Venus, underground bases on Titan and Pluto, people looking outward to the nearer stars—to the triple system of Alpha Centauri, only four light years away. I raced across the wispy clouds below, out running the shuttle to Earth's edge, where I gazed out into the starry blaze of the galaxy and forgot all my doubts.

Deep space. Sunspace was just a backyard compared with what lay out there. Yet I could blot out a million suns with my hand. The thought of going out there, of becoming even a small part of humanity's Sunspace Settlements, sent a happy chill up my back, and I was no longer afraid.

What appealed to me most was that the rest of the solar system had not been *given* to humankind; people like me had gone out there to build and transform worlds for themselves. It seemed right to be able to do that, so much more human and creative than to be handed a world at birth by nature.

"What is it?" Morey asked.

"Just thinking. Neat, isn't it?"

"It's very beautiful," he said softly.

Clouds floated up and covered our screens; then the shuttle fell through into sunlight, and the sight of the world below filled me with wonder.

Blue-green jungle covered Earth. We were in the final approach glide to Clarke Equatorial Spaceport.

"Take it easy," Morey said. "We haven't even left the planet yet." But I could tell that he was also excited.

The big screen at the front of the aisle flashed:

JUNE 29, 2056, 2:02 P.M.

ETA: 2: 10 P.M.

Morey and I tightened our seat belts. The screens showed the spaceport ahead—square after square of cleared land covered with buildings, hangars, roads and walkways, and spacecraft crouching on launch pads. Earth's spin being fastest here on the equator—sixteen hundred kilometers per hour—it was most economical to use that extra push to throw vehicles into orbit.

Almost every kind of launch system had been tried here, from complex stage rockets belching chemical propellant to track catapults to laser-fed and atomic rockets; various versions of these systems were still operational. There had even been a plan to run a cable elevator from an island out in the South Atlantic to an asteroid satellite in High Earth Orbit. That would have been awesome—a bridge disappearing into the sky—but the scheme had been abandoned for various technical, political, and safety reasons, even though it might have been successful if enough people had persisted.

The new gravitic catapult had come along in time to make most other systems obsolete. I was eager to see it in action. Maybe our flight was going to use it, I thought excitedly.

We were very low now. I tensed as the craft touched the runway and the feeling of free fall faded from my stomach. The shuttle slowed, but slow was still very fast; the ship covered several miles before coming to a halt.

"We're here," Morey said. He seemed a bit shaky as he unclipped his belt and stood up.

"What is it?" I asked.

"Upset stomach. It's going away."

I got up, and again I realized that we had come to a place that sent people through the sky into the blackness beyond Earth. The thought struck me in the most stupidly obvious way, and I teetered on the edge between excitement and fear as I followed Morey to the exit and out into a long tunnel.

At the end of the passage we put our cards into the passport check and pressed our palms down on the scan. Our cards popped back; we took them and went out into the waiting area, and it seemed to me suddenly that my whole previous life lay a hundred years or more behind me. I was free forever of the things I had worried about yesterday.

The sun and countryside were visible through the massive dome of the waiting area. Temperatures outside were probably over forty centigrade. The rain forest pressed in around the spaceport, and I thought of it as a sleeping thing that dreamed its animals, insects, flowers, and greenery; but it could not have dreamed the spaceport; we had done that ourselves, and I wondered if the forest were jealous.

Hundreds of people filled the great floor of the terminal, waiting to depart for all parts of Sunspace. Some stood by their luggage. Many were well dressed; others looked poorer. I noticed a group dressed in gray uniforms with red arm bands.

"Convicts," Morey said. "Probably shipping out for the mining towns of the Belt."

I stared at their glum faces. One young woman gave me a loutish look. Earth had turned against them. It was a sure way of making certain that a criminal would not repeat his crime anywhere near where he was sentenced.

"They'll probably never come back," Morey said softly.

"It's sad."

"Happens all the time," Morey replied.

A muffled roar startled me. I looked up and saw a ship cross the Sun's face, rising on vertical turbojets. Its nuclear pulse engine would ignite in the upper atmosphere and push the vessel away from Earth with a steady acceleration. The reality of it rushed through me like a jolt of electricity. Such ships and their larger cousins crossed the trillion-kilometer whirlpool of sun and planets in a few weeks. And the new gravity launchers would hurl them off the planet even more economically.

A 3-D sign flashed in my eyes:

**ORBITAL TOURS!
SIGN NOW!**

I blinked nervously and saw a holo of Earth from Low Orbit; then one from High Orbit. Elephants and human shapes tumbled through the void. Power satellites beamed energy down through the atmosphere, serviced by stubby robots and toy figures in spacesuits.

**BECOME A SUNSPACER!
HIGH PAY AND A SCENIC PLACE TO LIVE!
PLUMBERS, ELECTRICIANS, VEHICLE AND
STRUCTURAL MAINTENANCE SKILLS NEEDED!
TEACHERS WELCOME!
APPRENTICE APPLICATIONS AVAILABLE
FOR ALL JOBS!**

To many people Clarke Station was probably just another travel terminal, even though people were going home to Marsport, to the Moon, or to places that had only coordinates in space for an address; but for me it was all new suddenly, as if it had begun yesterday morning. Maybe I was taking my mind off the big change in my life, but I didn't care; our solar civilization was big and growing bigger, and I was going out to see its true size. I wanted to cheer. There were millions of people out there, and they thought of themselves as being from space in the same way I thought of New York City as home. And somewhere in the terminal there was probably a Sunspacer who was coming to Earth to study, and feeling just as excited as I was to be leaving.

"Come on," Morey said.

I followed him, imagining a whole civilization in space, thousands of space habitats, millions of people eating and drinking, going to school, raising children, playing, thinking, and feeling, dreaming about the stars. One day the free habitats would scatter out into the spiral arms of the galaxy in search of resources and knowledge.

I was going out there, and maybe I would help make it happen. I tried to picture the reality of off-planet life; it was something I had always taken for granted, but now I was going to see it for myself.

"It's neat," I said, walking next to Morey.

"What is?"

"All this, here, and where we're going."

"It's not so neat," he said. "It could be much better."

I didn't know quite what he meant, but he didn't seem to care whether I understood or not. "It doesn't seem possible that human beings could have done it all," I said.

"Well it wasn't just given to us one Christmas."

"I know we built it," I said stupidly. "Human beings, I mean."

He stopped and looked at me. We put down our bags. "You really want to know? All this happened because of a small group of people with pencils and paper—the theoretical physicists and chemists of the last five centuries. The engineers and builders applied their work, but it was all really finished a long time ago. We're still catching up with the theoreticians."

"Well, sure, I know. But the builders still had to make it all real."

He shrugged and picked up his bag. "They'd have nothing to do without all the hard work being done for them. We'd still be riding horses."

I couldn't get upset at what he was saying, not just then; he wanted to become a theoretical physicist, after all. I imagined a team of white horses pulling a giant wagon through space. The driver was cracking a whip and shouting at the stars. It didn't bother me that he wasn't wearing a spacesuit; neither were the horses.

[|Go to Table of Contents |](#)

4

Through The Sky

The inscription on the giant block of stainless steel in the center of the terminal floor read:

EQUATORIAL SPACEPORT 1

OPENED FOR THE PEOPLE OF EARTH
2002

THE STEEL IN THIS MEMORIAL WAS MANUFACTURED
OUT OF ORES MINED FROM THE FIRST ASTEROID
BROUGHT INTO EARTH ORBIT
2018

"Ten minutes to boarding," Morey said, sending another chill of expectation up my back. We were really going; it wasn't just something we were talking about.

I heard a muffled, crackling roar, and looked up in time to see a stubby orbiter rising on a red laser column. The beam tracked the ship, pumping energy into its engines. As the orbiter grew small and disappeared, I imagined its rising arc over the South Atlantic. The laser winked off as the craft attained enough speed to make orbit.

"We can look around some," Morey said in the sudden quiet.

Human beings were aliens on the equator, I thought as we began to explore the interconnecting domes; the heat and humidity outside could kill.

The first dome we entered was filled with recruiting booths. Flashing holo signs hurried us to join in the building of new worlds:

FIND YOURSELF!
IN EXCITING WORK!

Spacescapes revealed distant parts of the solar system. The 3-D images produced vivid afterimages in my visual field, I was beginning to dislike being seized by the throat to get my attention.

"Now boarding!" a male voice boomed. "Shuttle 334 for Bernal One!"

"Didn't your folks want to come and see you off?" Morey asked as we waited on line.

I shook my head and felt sorry for myself. "They didn't even come to graduation."

"What? I thought they were there."

"I didn't want to bring it up. It doesn't matter."

"What happened?"

"Nothing much. They had a fight and were out of town."

There were a few people our age on the line, and I wondered if they were also going away to school.

"Parents think they'll have you around forever," Morey said as the line began to move forward. "Then they crack up when the time runs out and they realize they can't make up for anything."

I took a deep breath. "It was more than that, Morey. They're breaking up. Dad wanted the usual renewal and Mom just wouldn't give him one. It's their problem now."

"Well, it happens." He glanced at me. "I'm sorry, Joe."

"Bernal One!" the same male voice announced. "Last call!"

This was it. I was going out there, into the darkness of space, protected only by the shuttle.

"Didn't you have a bag?" Morey asked as the line moved through the tunnel.

I looked around, not really caring. "Must have left it somewhere. They'll send it home to my parents. I can do without that stuff."

"Got your wallet?" Morey asked, grinning.

"Sure, right here."

"Credit codes?"

"I never forget."

We came out of the tunnel and boarded the tube car that would take us to the pad, two miles away. I grabbed a window seat and stared outside. It was the first time for both of us, and I wondered why Morey wasn't as excited as I was; maybe Aristotle was right—knowledge killed the sense of wonder in the knower.

The car slid forward and shot into the darkness. I turned away from the window and looked around the brightly lit inside, wondering if I would get to know any of the faces at school. Most of the girls were alone, as were the boys. Only one girl was with an older woman, but she could have been a sister. One boy seemed to be with both parents, and he was looking uneasy.

The car glided out into a brightly lit area and slowed to a stop. Somewhere above us was the gravitic shuttle, waiting to carry us through the sky.

"How's the stomach?" I asked Morey.

"All better," he said as we stood up.

Emerging out onto a platform, we took our places on the line in front of the elevator.

"Attention please!"

A young man appeared at our right, hands on hips. He seemed to me to be looking at us critically.

"I'm your guide. My name is Kik ten Eyck," he announced loudly. "I'll be with you until we reach the college." I thought he sounded as if he were herding a bunch of sheep. "I'll be around to answer your questions and help you with any problems." It was just a job to him, it seemed. Deliver the Earthies, dump them in the dorm, and get paid. His casual manner was probably fine for very nervous types. The flight was no big thing for him, and that would calm some people, but he seemed arrogant to me.

When our turn came, Morey and I stepped into the lift with half a dozen other kids and were whisked up the ship's center to our seats.

Seats 22 and 23 were a third of the way to the nose. I grabbed the window seat again, but it didn't matter; as in the air shuttle, there was no port, only a small screen on the overhead partition. It made for a safer ship, allowing for extra shielding from radiation and meteors.

"It's bigger than I thought," Morey said, peering up the shaft.

The empty lift went down past us. "Please fasten your seat belts." In the confined space the voice sounded as if it were talking in my ear. I sat back and looked up at the screen.

It lit up, showing a crisscross of black roads, with weeds in between. "The launch plate," the woman's voice continued, "is a finely tuned installation that must be protected from heat and dust." The weeds moved as the cover was pulled back, and the launcher emerged from below ground, a metal tube with a silvery ship standing halfway out of it, ready to pierce the sky.

I heard a high whining sound. My arms began to feel heavier. It seemed strange to be watching the ship I was in.

"Gravity inside the ship," the woman's voice went on, "will increase to six times normal before the shuttle is released by the reversing field."

The high-pitched sound grew louder. Vast amounts of power were flowing in to create the repelling g-force. Our seats adjusted to face the overhead screen. I felt myself being pressed back into the heavy cushioning.

"I feel like an elephant," Morey said.

The blue sky on the screen shimmered from the singing sound. A strange, hurrying happiness filled me.

I was the ship as it went up. A burst of yellow-orange sunlight struck my eyes; weightless, I fell toward a blue ocean of sky....

It was strange to see a spacecraft lifting without a laser or jets, rising but also dropping away from Earth, since a reversed gravitational field was involved. An invisible cone of negative gravity was pushing the vessel up to the speed needed to reach the Moon's orbit.

The ship climbed through the sky, fleeing the piercing cry of the launcher, becoming a small needle on the

screen, held in a gravitational vise between heaven and earth.

I fell back into myself as the picture blinked and we saw a 3-D view of Brazil next to a sparkling ocean; The holo blinked again, showing stars and the glowing, deep-violet curve of the planetary horizon. We were coming out of an ocean of air into the splendor of Sunspace, pushed outward from the cradle of life by the mirror image of Earth's own attraction. The ship had its own maneuvering engines, of course, but the short passage to Lunar Orbit did not require a fully powered trajectory. We would be in the weightlessness of free fall all the way to the Bernal Cluster.

"We'll be reaching a speed of eighty thousand kilometers per hour," the whispery voice said, "but allowing for slowing and maneuvering, the journey will take about twelve hours. Enjoy your trip and use caution in moving around. Zero-g pills will be dispensed by the steward to those passengers who may need them." The voice seemed to chuckle for an instant.

"May I help you?" a steward asked from the passageway.

Morey grabbed the pills and swallowed them with water from a squeezeball. I hadn't noticed how sick he had become.

The steward looked at me. "How about you?"

"No, thanks," I said, even though my stomach gurgled a bit.

"You'd better," he insisted.

I took the pills and forced down the water, noticing that Morey seemed a bit relieved that I wasn't immune. He had obviously been trying to hide his discomfort ever since the air shuttle.

"Thanks," Morey said, passing my squeezeball back to the steward.

"I'm Jake LeStrange. I'll be here if you need me. If you want a snack or drink, just push the button. The slots aren't working yet." He spoke with his lips close together, as if he had something in his mouth. His hair was cut down to a stubble on his skull; some of it seemed gray, but he looked young.

"No food," Morey said. "Don't even mention it."

"Barf bags are here," Jake said, pointing, and floated away.

Morey took a deep breath. "I see this ... mess sloshing in my gut. Hope you're not going to eat anything."

"I don't feel too good myself," I said, even though I was actually feeling much better than Morey.

Stars showed on the screen. Earth's sky was behind us.

"You may have a more direct experience, if you wish," the whispery voice said, "by using the personal viewer." A slot opened under the screen. I pulled out the goggle-like viewer on its cable.

"Want to look?" I asked Morey.

"Not now."

I put it on and looked out through the ship's eyes, into a deep blackness filled with stars. It was not the same as looking at a holoscreen; this was 3-D without a frame. I was out in space without a suit, yet safe from the heat and cold and lack of air.

I looked back at Earth and saw the glow of its atmosphere, that protective membrane which filtered sunlight down to just the right intensity. The planet seemed safe and peaceful, a good firm place to put your feet. Of course, it was a safe home only because we had adapted to the amounts of sunlight it received, though not perfectly; we could stand up in its gravity and breathe the air, though not without some difficulties. The planet was safe, except for natural disasters, which still killed too many people.

But life had a good chance on Earth. It was still the main home of humankind, and a better place than it had been during the twentieth century, when irresponsible forms of technology and industrialization had endangered the whole planet, even while making it possible to support the largest number of people in all history.

Things had improved when people had pioneered Sunspace, gradually taking the dirtiest industries out into that vastness of resources and the Sun's streaming energy. Earth was recovering because people had learned to see it as I was now seeing it, as only one place, not the whole universe.

Earth was a huge organism, alive because death was part of its recycling system. I don't think human beings had ever forgiven it that, as much as they tried to love nature. The last century and a half had seen the conquest of the air, the splitting of the atom, the settling of space, and a continuous attack on disease and death. But we could never be sentimental about nature again. The rebellious skills of civilization kept us alive on Earth and beyond it.

Some Sunspacers claimed that they wouldn't need Earth at all in time, that it was the home of a dying culture, holding humanity back from the stars. It wouldn't matter in the long run, I thought, watching cities wink on their lights as darkness crept across the globe. Earth and the Sunspace Settlements were doing well, so it had to be pride and cultural rivalry. No, that wasn't completely it, I thought, remembering the real grievances of the miners on Mercury, as well as the sense of growing economic dependence that Earth felt toward off-worlders.

The view made a full turn, giving me the illusion of my head turning around on my shoulders. The Sun swept by—toned down to protect my eyes—our own magnificent hearth-fire in a cave of stars; the Moon's silvery face sailed into view. I heard Morey throwing up at my left, but I didn't want to embarrass him, so I kept the goggles on, marveling at the dense star fields beyond our solar system.

Morey and I found out that we had to strap down fairly tightly in order to sleep in zero-g, to keep from drifting even a little. There were those, I learned later, who liked to sleep with loose straps, floating a bit; some liked to float free completely. I was too new at it to have a preference.

Unable to sleep deeply, I floated over Morey, who was asleep with hands gripping the arm rests, and drifted out into the passageway. Slowly, I pulled myself along to the men's washroom in the midsection. Suddenly it seemed that the nose was the bottom of a long drop. I cried out, expecting to fall.

Jake LeStrange was in the small lounge, drifting against one wall, dragging on a cigarette. He looked bored when I floated in.

"Hi, kid. Can't sleep?"

"Guess not." I didn't like the "kid" bit.

"It's common the first time. Later you can't wake them. Reminds them of being in Mommy's belly."

"Really?" I asked sarcastically.

He scratched his shaved scalp. "Something you want, kid? The toilet's in there. Read the instructions

before you let loose."

"Thanks, I think I can figure it out."

He grinned.

I didn't like him, I decided as I drifted into the enclosure and slid the door shut. Sunspacers and earthies just weren't always going to get along, I realized, wondering how much was my fault, if any.

A jungle of graffiti grew on the walls. A few lines caught my eye:

Principal products: Moon—green cheese.

Mars—red sand.

Earth—salt water.

The meek shall inherit the Earth.

They can have it!

The rest of us are going somewhere else.

Watch out for the coriolis force on Bernal.

Wear a mask when you pee!

Most of the others were just as dumb, or confusing. Pride lay behind the words, misunderstanding, as well as political and economic grievances that would have to be settled before real hatred took hold. Maybe it was already too late; no one was sure what would happen if the miners on Mercury went on strike, as they were threatening. Earth was importing too much from Space to ignore the possibility of major shortages. It seemed to me that the Sunspacers were doing a lot, and not getting as much respect for it as they would have wished.

I wondered if Jake might have written all the graffiti, since they all seemed to have been printed by the same hand. It wouldn't have surprised me.

I opened one eye. The Moon was on the screen.

"Breakfast in ten minutes," the whispery voice said. "Open your slot and remove the contents while they are still hot. Put everything back when you are finished and please make sure the cover is closed." The voice sounded half asleep and bored with reading the instructions for the thousandth time.

"We'll be docking at Bernal One early this afternoon," it continued. "Have a pleasant morning and be careful when moving around."

I heard a laugh. Jake was floating in the passage. "What she never says is how many people have broken their necks in zero-g."

"Thanks for telling us," I said sarcastically, hoping he would go away. Morey was waking up.

"Sure," Jake went on. "They think because they're weightless their heads don't have any mass either." He chuckled as he held on to the hand bar, sounding as if he were gargling saliva. He probably tried these stories on anyone who would listen.

"Who's the voice?" I asked.

"Sylvia's the copilot. You should hear her when she's been up a week." Morey opened his eyes, looking angry. "Do you mind? We're just getting up." Jake slid the divider shut.

"A pest," Morey said.

"Sure is. How do you feel?" He looked pale.

"My circulation feels bad. I get dizzy." He focused and looked at me. "How about you?"

"Okay, I guess. Sometimes I get the feeling that we're falling in that direction." I pointed toward the nose.

He grunted. "That's exactly what we're doing."

"Breakfast," I said. The light was on over the utility slot. I brought up my seat, slid open the panel, and reached in for the tray. It was hot in the small space. Morey drew up his seat as I took out the tray and placed it on his magnetic handrests. Everything on the tray was held down by stick strips. I took out my tray and sat back, held in place by the strap.

Coffee and juice came in suck tubes; oatmeal in a big squeeze bulb; scrambled eggs and ham in a widemouth bulb.

Our divider slid open halfway. "Food okay?" Jake asked. Morey nodded.

Jake looked at me.

"It's okay."

"It used to really stink," Jake said, floating away.

"Feel better?" I asked as we continued eating. There was some color in Morey's face now.

"I think so."

He stretched and yawned when he was finished. I got rid of the trays.

"Thanks," he said, staring sadly at the screen, as if he were trying to remember something.

"What is it?" I was beginning to worry about him.

"Earth is so small."

"It happens when you go far away from something."

"It looks lost," he said, ignoring my joke. "We're leaving everything behind. Most of what has happened to human beings happened *there*."

"Yeah, I know," I said, trying to sound sympathetic. I thought of all the windows I had broken in the condemned sections of Westchester before we moved to Manhattan. I wondered if Willy, my fellow destroyer, still lived there. The area had been rebuilt into a residential arcology, housing a half million people in a tall pyramid, and the new windows were unbreakable.

"There's more than Earth now," I said. "We're not all in one place, but I know how you feel. I was thinking the same things about four o'clock this morning."

"I'll miss the pizzamat near my house," Morey said.

"Don't worry. As long as you can order the same recipe on Bernal, it'll be just the same."

At 2:31 in the afternoon, Bernal One slid into view on the screen—a huge ball with what looked like tire

tubes piled up on its north and south poles.

"Please strap in," Sylvia said.

The ship was turning for its approach as Morey and I buckled in. Bernal One grew larger, but it sure didn't look sixteen kilometers across, or as if fifty thousand or more people could be living inside; but there was nothing in our field of view with which to compare it.

Braking thrusters fired, pressing us into our cushions. We came in high over Bernal's north pole, then twisted slowly to face down into the hole of stacked tires, which now looked more like doughnuts, where the open docks were located. The ship made minor corrections as we drifted into the mouth. I caught sight of several space suited figures making repairs outside with welding torches. Bernal settled down on us, obliterating the stars as we drifted inside and nudged to a halt.

Morey smiled at me. "Well, we made it."

"Routine, almost dull," I said, not meaning it.

"Sure," Morey replied, sounding much better.

People drifted past us in the passage. Morey and I unstrapped and joined the flow, pulling ourselves along the handbars to the rear exit, where we floated out into a large, drum-shaped zero-g space. Handrails crisscrossed this interior, snaking in and out of openings. About a hundred people were waiting, hanging on the rails like so many coats on a rack.

Kik ten Eyck darted in through an entrance at my right, and stopped where the rails crossed in the center.

"You'll go inside in small groups," he said loudly, "and your counselor will take you as far as the dorms." He looked around at us for a moment, then shot out of the chamber.

"Some service," Morey said, looking pale again.

A girl floated toward us after a few minutes. She was dressed in a white leotard, brown shorts, and stick boots. Her red hair was braided and piled on top of her head. I guessed that she was about twenty.

"Hello," she said, attaching herself to the drum wall with her boots. "I'm Linda ten Eyck. We'll be entering the biosphere through its north pole, the same zero-g axis along which you docked. Your sense of weight will increase as we move off that axis toward the equator, where it will feel almost Earth normal. Remember, 'gravity' here is really centrifugal force, *so try* not to trip over your feet, and don't *jump*. It's not too dangerous, but you may not land *exactly* where you expect. Even a sphere rotation of less than once a minute can't reproduce the perfect illusion of a genuine gravitational field. Oh, one more thing. Going through zones of varying gravity may temporarily affect your balance, but don't worry. Most people get their space legs quick."

I was watching her as she gave her talk. Her green eyes were a bit slanted. She was younger than I had first thought, maybe my age; self-confidence made her seem older.

"Let's go," she said, and launched herself across the drum. Morey and I crept along the rail. What if I couldn't adapt? Maybe I had a fussy inner ear that knew how to balance only on Earth. I was a little worried about Morey again; she had implied that there were people who couldn't adjust.

"This way!" she called without looking back. Her body was slim, but I noticed a surprising roundness in her hips as she jackknifed and slipped into the exit.

"She's probably ten Eyck's sister," Morey said as we pulled through after her.

"That's right." The name had gone right past me.

Suddenly we were floating straight up on a cushion of air. Linda was waiting halfway to the top of the tunnel. White light shone across her body. I heard Morey breathing next to me as we drifted up level with her.

"In here," she said, seeming impatient, and I felt that she thought me hopelessly clumsy. We drifted by her, into what looked like a rail car. The top was transparent, and there were large windows on the sides.

Morey and I pulled ourselves down into two empty seats near the back.

"Buckle in," Linda said loudly. I noticed another car ahead of ours. Both were now full.

"At least the seats look upright," a man said to his son in the seat in front of us.

"It doesn't matter," I said, buckling in. "We could be sitting on the ceiling and it wouldn't matter." The man turned and looked at us, then turned away, and I realized that it had not been necessary for me to share my knowledge. I was excited by our arrival, and a bit worried about Morey.

A few students looked confused. One father was holding his son's hand. I caught a glimpse of Linda in the front car. She seemed amused as the vehicle moved forward.

I peered out into the darkness of the tunnel. We slipped suddenly into daylight. A hollow world curved away in all directions, closing into a ball at the south pole, far below the ring of sunlight on the other side of the equator.

I didn't know much then about the system of mirrors and windows that brought sunlight into the colony, so it was hard to make perfect sense of what I was seeing. We were attached to our seats, heads pointing to the center of a great hollow ball. Suddenly it seemed I was looking *down* at everything.

"There's some weight," Morey said with relief. The illusion of looking down was gone. Morey took a deep breath. "Fresh air and greenery."

The cars ran on a monorail that gradually left the zero-g axis, delivering passengers from the space dock to the inner surface. The hollow ball was a giant centrifuge. Its spin threw you out from the center, but the inner surface was there to stop you, so it felt almost like gravity to your feet. Put a bucket of water on the end of a rope, whirl it around fast, and the water will stay inside. Not gravity, but just as good where you can't get any. I couldn't feel the difference.

Looking back, I saw the tunnel mouth rising away from us as we moved along the curved surface. I faced forward and looked around for Linda, but she had disappeared.

"Your sense of weight," her voice said suddenly over the speaker, "will increase as we near the equatorial zone. You can see the university ahead, to the right of the lake."

Again it seemed that I was looking down through a giant balloon. "Look at that!" I said, nudging Morey, but he had closed his eyes. Then the perspective reversed itself, and it seemed that we were traveling uphill toward the lake; but I was still getting flashes of downhill motion. Things started to look more normal when I stopped thinking about it and simply accepted the direction of my feet as down. After that the curve of the landscape was just an exotic detail.

I looked at Morey. He still seemed pale, but his eyes were open and he was looking around. I was glad.

"Feeling better?"

"I'll be okay," he said, still looking a bit embarrassed. "How about you?"

"Great. Can't wait to get outside."

[Go to Table of Contents](#) |

5

Bernal Hall

I began to feel heavier as the monorail slipped toward the equator. Looking up, I saw a pedal glider moving across the bright open space of the globe. "That's not a dead-stick glider," Linda's voice explained. "It's a human-powered aircraft with a propeller." Far to my right, a group of people seemed to be playing football, except that they were high jumping and somersaulting in low gravity.

Everywhere I looked there were houses—old and new designs, two and three stories high, some of them looking as if they had been snatched off twentieth-century Earth, or earlier, and attached to the inner surface of the hollow sphere. Country roads passed slyly in and out of forested areas. The equatorial lake spilled a river around the world; streams branched from the main flow; small bridges straddled the waterways; people were everywhere, accepting their world in the ordinary way.

It was ordinary to them, but it couldn't be that for me, not yet anyway, if ever. It filled me up with its reality, its impossible neatness and order. I couldn't believe that we were traveling to a dorm room; everything would be different here, even beds, desks, and bathrooms. I was inside a world on the other side of the sky; a few centuries ago that would have meant that I had died and gone to heaven.

"Many people from Earth," Linda's voice continued over the speaker, "have the idea that space habitats are small, cramped places ..."

"We're not *that* uninformed," Morey said sourly.

It still seemed to me that Dandridge Cole University lay at the bottom of a hill, but the angle was flattening out. I saw circles of buildings on the left shore of the lake.

"... and that's the park in the center," Linda was saying. "Dorms in the inner circle, classrooms in the middle one. The outer ring is for research and advanced studies. Agriculture's in the farm toruses—those doughnuts stacked on the outside, which you saw during docking."

I turned and looked back at the north, then south again. The poles were the holes in the hollow tires, opening into the worlds of the toruses.

"Can't you sit still?" Morey asked.

I leaned forward and peered toward the ring of sunlight around the south pole. Bridges crossed the brightness. Just then we glided over a river of light, and I realized that this was the northern sun circle. A glowing band curved away left and right.

"A circle of windows with exterior mirrors," Linda said, "which cast light inside ..."

"She's so thrilled," Morey said.

I looked at him with disdain. "What's the matter?"

"I'll be fine."

He still wasn't, but he wasn't going to admit it.

The landscape seemed to become more level as we neared the equator. Even inside a hollow ball, a diameter of sixteen kilometers will give some sensation of flatness when you're not looking across a large distance; there's no way to hide the fact that you're inside a hollow ball, that people are going about their business at right angles to you, and overhead, but in time you do accept the rightness of it. It couldn't be otherwise once you understood the conditions; the same thing is true of Earth.

The big lake glistened at our right as we rushed over a stream and entered the outer ring of the University. Here the research buildings were three-story drum shapes with curving window bands. Greenery flashed by, and we were among the classroom structures—two-floor saucers, single-level rectangles, domes, and ovals. Students hurried along walkways and sat on benches.

I caught sight of a large group carrying electronic signs. The scene went by fast, but I was able to read three of the displays:

END DEATH ON MERCURY!
FREE THE MINERS!
EARTH'S SHAME!

"Did you see that?" I asked Morey.

He nodded and shrugged. "Politics. Some people never outgrow it."

His answer irritated me. "But you know it's a just cause. You've said so yourself."

Another green area flashed past, and I saw the dorms—three-floor red brick-patterned drums with window bands like those in the research ring.

Morey nodded impatiently. "I know—but in the end it will be the application of *real* power that will bring the settlement. The words of the agreement will just be a rationalization. Those students out there are just the cheering section for one of the power sides."

"I don't care," I said angrily. "What they say is right, isn't it?"

"Sure, nothing can change the truth."

"People should hear it publicly then."

"Coming up," Linda announced, "Bernal Hall, Clarke Hall, Hawking, Ley." She spoke softly, as if something had distracted her. Morey's comments had disturbed me. He was on the right side, but he didn't seem to want to do much about it. Not that I had any idea of what to do, but it seemed to me that one had to be willing to try, at least.

"I have to lie down," Morey said suddenly, the color fading from his face.

"We'll be there in a minute. Hold on."

"Bernal!" Linda shouted as we slowed to a stop. "Watch your step and good luck."

I unbuckled Morey, then myself. "Come on." I stood up.

Morey hoisted himself with a grunt, and we went to the forward exit, where we stepped out onto a

narrow platform. The cars pulled away.

It was warm outside, reminding me of late spring in rural New York. We wandered down a shallow ramp and found ourselves on a walkway. A sign read:

Bernal Hall

There was no other building at the end of the path, so this castle turret had to be it. As we approached I noticed that Morey and I had two shadows each, one from each Sun ring at the opposite ends of the world.

I stopped and looked up. Morey kept going. "Come on, Joe, I've got to get inside."

"It's like a big map," I said excitedly. The air was crystal clear in the bright sunlight. The buildings, streams, and roadways on the other side of the sphere were very distinct. "It looks farther than I thought it would."

"Come on," Morey said impatiently.

Living all our lives on the outside of a ball so large that people once thought it was flat was no preparation for suddenly moving *inside* a small planet, where the Sun was two hoops of light and the stars were under your feet, on the other side of a gently curving surface. My mind understood this world, but my body had to get used to it day by day; my imagination had to invent the world all over again.

"I feel queasy," Morey said, reminding me that his body was having a tougher time than mine. He took a deep breath and turned to go inside.

"You'll get used to it," I said, catching up to him. "I know you will." Suddenly I was afraid that he would have to go back to Earth.

A side door opened for us, and we went in, stepping into a brightly lit hallway that curved away to the right.

"It should be on this floor," I said as we counted off the numbers from 112 down. There was a sign on 108:

Joseph G. Sorby
Morey Green-Wolfe

I didn't like the formal look the middle initial gave my name.

"Here's us," I said, pressing my palm against the lock ID.

The door slid open; lights and ventilation cut in as we stepped inside. Morey sat down on the bunk that stood against the left wall. He gulped air for a moment, then struggled to his feet and staggered to the door. It slid open, and he shuffled out toward the bathroom down the hall.

The phone on the right-hand desk buzzed. I sat down and thumbed the line open, wondering if this set was cued to my ID. Dad's face appeared on the small screen, making me feel that I hadn't gone very far from home at all.

"Well, you made it," he said after the usual three second round-trip delay in the signal. "Good trip?"

"It was okay."

"I should have come with you," he said after a moment. "Why didn't you tell me about the picnic for parents and students? You'll go anyway, won't you?"

That made me angry. It was easy for him to be sorry now. "It was *your* business to know," I said, and waited.

"You're right," he said after the dead spot. "Got your money codes?"

I nodded. "Look, I've got to unpack, get sheets and stuff."

"Don't use more credit without telling me first. Call when you want, on me. Leave a message if there's no answer."

Yellow flowers dotted the lawn outside my window. Nearby dorms were chocolate cakes with silver windows for frosting.

Dad sniffed. I knew he was feeling guilty, but I didn't care.

"How's Morey?"

"A little sick, but he'll get over it."

"Will you come home for holidays, or should we come out there?"

"I don't know yet."

The delay seemed longer as I struggled to control my resentment.

"Glad to be out there?"

"Sure."

"Well," he said after the pause, "it seems right for you, and that's important. I'm sure you'll do well." *Be glad you got what you wanted*, he was really saying, *but you're on your own* .

I nodded, unable to say anything. Finally I forced a smile.

"Good luck, son," he said, biting his lower lip. "Eva will call you in a few days."

The picture went dark. I sat there, telling myself that I should have let him have it when it would have hurt the most, because he had called to make himself feel better. I got up after a while and went to look for Morey.

Mom would have wanted me to have a private bath, I thought as I came to the double doors and was let into a large square room with a dozen sinks, showers, and toilet stalls. She wouldn't have liked the small phone screen either, but I didn't care; I wouldn't have to do any cleaning, so it was worth it.

"Joe?" Morey asked from the end stall. He wasn't improving the atmosphere any. I almost had to hold my nose.

"What is it?"

"I'm still not feeling better."

"You want a medic?" I'd never heard him sound so down.

"Maybe I'm imagining too much. My mind knows it's not real gravity, so I keep thinking about the spin that holds me down."

"Forget it."

"I'm glad my parents aren't here. Mom would say my tummy has the whoopsies and Dad would say, gee—this whole place spins, and Mom would suggest that maybe I shouldn't stay at all ..."

"Going to the picnic?" I asked.

"How can I?"

"I'll keep you company. But not in here."

I went out through the sliding doors and wandered back to the room. My lost bag was on my trunk. I checked the address label and saw that it had been changed to my new address—by Mom, probably. Unpacking would make an exciting afternoon, I thought, still feeling a bit angry and depressed. I wasn't really here yet, I realized. I wanted to be here, but I was still back on Earth.

I sat down at my desk and examined the library link, noticing the portable screen for those who might like to work in out-of-the-way places. I gazed out the window at the hill that fell away to my right. The tall grass would be a great place to lie down and read. I wandered over to my bed and lay down, realizing that I hadn't escaped anything; there would be new problems here, and the old ones would continue to visit, as long as there were phones and I was still Joe Sorby.

I would have to become someone else.

Silvery light filtered in through the window when I opened my eyes. Morey's dark shape stood over me.

"What's the time?"

"About midnight," he said.

"Fell asleep," I mumbled, sitting up slowly.

"They gave me something at the infirmary, so I went over to the picnic."

"Why didn't you wake me?"

"You looked so peaceful, like you needed it. You didn't want to go anyway."

"What was it like?"

"The university president spoke, telling us that more people from Earth should visit the Sunspace Settlements to promote better understanding of where the future lay for our civilization—off-planet. There was a demonstration for the miners on Mercury. It didn't last long. A lot of students seem to be involved in the cause." He sounded impressed and a bit uncertain.

I sat up on the edge of the bed and rubbed my eyes. "The trip tired me more than I thought."

"You're a bit sick from the changeover. People react differently, they said at the infirmary."

"What's that light outside?"

"The mirrors bring in moonlight same as the Sun."

"I don't remember falling asleep."

"Okay now?"

"Sure."

"Breathe deeply once in a while. I take it the other side of the room is mine."

I nodded. "The phone's coded to me on this side. I missed dinner."

"It was at the picnic."

"Maybe I'll go back to sleep."

"It's a nice night. I'm going for a walk." He gave a crazy laugh, like his usual self. He was obviously relieved to be well again. "It's always a nice night here. How could it not be? They turn it on and off." His dark shape moved toward the door.

"Morey?"

He stopped and turned around, but I couldn't see his face. "What, my friend?" his dark shape asked.

"Are you glad to be here?"

"Now I am, after they fixed me up. Aren't you?"

I was grateful he couldn't see my face in the darkened room. "Sure. Just wanted to know."

The door slid open as I lay down. He went out, and it whispered shut. I relaxed in the strange silence and thought of all the space and stars outside the shell—and dreamed I was down in the dorm basement, opening a trap door into the glowing universe outside. The dream was wrong, of course, because the stars were motionless; they should have been moving as Bernal rotated. I fell through the bottom of my new world and drifted away, breathing cold nothing as the naked Sun blistered my face until it looked like a bowl of oatmeal, and I was forced to keep telling people my name because they couldn't recognize me.

[|Go to Table of Contents |](#)

6

Getting Settled

There were about fifty students in the dorm's main lounge when Morey and I walked in the next morning. We were given a few once-over stares as we sat down in the back row of the circle of chairs. There was a guy wearing a turban in the front row, sitting next to a couple of slender African women. They towered over him, even sitting down. There was a Japanese kid in the second row who kept turning around and looking past me. Next to him sat a girl with a colorful kerchief over her head. She sat stiffly, as if afraid to look left or right. Suddenly I had the feeling of being trapped, and that nothing was going to be as I had imagined.

There was a loud group of kids at our left, dressed in multicolored metallic sheen shorts and sleeveless shirts. Then I saw Linda ten Eyck with them, and I knew why they sounded so confident; they were all from Bernal or the other settlements—the Sunflower Habitats at L-4 (that's the other Libration Point, one of four such stable areas in the Moon's orbit, equidistant from Earth and Moon), the Moon, Mars, maybe

even the Asteroids. They were laughing and talking as if the rest of us didn't exist.

A tall, deeply tanned man came in. There was some gray in his sandy hair, and even more in his beard.

"My name is Bill Turnbull," he said as the chatter quieted, "and I'll be your orientation adviser." He gazed at us with calm gray eyes. "Most of you are physical science majors. That's why you came here, and why you were accepted. You local students can study what you want because we have to take you, but that doesn't mean you can coast. *Anyone* can flunk out, and all the programs are tough. A few major points to keep in mind. Do not spend all your time at your desk link, even though you can learn very quickly that way: You are expected to get to know your tutors and classmates." He looked around at us carefully. "Personal growth suffers when you cut yourself off from the lively *connections* made when bright people get together. Use links for busy work, for catch up, to prepare for discussions with peers and superiors. The *real* goal of your work is not just to know a lot, but to be creative in your area, to contribute to its growth while growing up as a person. All work is for people in the end, even when we benefit ourselves individually." He paused. "If we suspect abuses, we will place a limit on the use of links, and then they will shut down if overused. We've never had to do that."

A tall, thin boy with short black hair stood up three seats to my right. "Does this include talking to other students or teachers? About work, I mean."

Turnbull sighed. "No, but we feel that people are worth talking to personally. It's a Sunspacer value. People are unique presences in the universe, to be held dear."

I liked what Turnbull was saying.

"Anthropocentric prejudice," the boy said with contempt.

"Maybe—but we don't use it for harm. Out here we believe that human life must be at the center of things. Call personal contact our little ceremony, our prayer before a hostile universe, our way of being a community."

Turnbull's words made me feel good, needed. The boy shook his head in amusement and sat down.

"Other questions?"

After a moment of silence, the black-haired boy spoke up again, obviously unable to restrain himself. "Are we here to learn religious dogmas or science? I'm here to study physics, and I don't care about much else, and it's not up to you or anyone to make me care or tell me how to live."

"No one will stop you from doing your work. Don't you have any customs where you come from?"

A short, auburn-haired girl stood up in front of me.

"I think he's just shy and wants to be left alone, but he'll change." I liked her voice and hoped she would turn around.

"What complete nonsense!" the black-haired boy shouted, crossing his legs and leaning back. "Next you'll tell us we have to join the marches for those miners on Merk."

"What's your name?" Turnbull asked.

"Christopher Van Cott. Does it go on a list of baddies?"

"Where you from, Chris?"

"Chicago Arc One. And it's Christopher."

"You know, Christopher, there are few real loners in science. It's a cumulative, cooperative venture, even for those who won't admit it."

"For the pure in heart," Van Cott said.

"Aw, shut up!" someone shouted.

Van Cott sounded dedicated and independent. A part of me liked him, despite the blind spots.

"The place for extreme individual visions is in literature and art," Turnbull said.

Turnbull did seem a bit prissy. Wear a smile and have friends; scowl and have wrinkles. But people wanted to get along out here; cooperation had been absolutely necessary to build and operate worlds from scratch. Traditions were newer out here. You could be more of a wolf among sheep on Earth, but even there it was getting harder. As for the part about science, it seemed to me that it got done any way it could, cooperation and good manners aside.

The session left me wondering a bit about what kind of person I was. As we stood up to leave, the auburn-haired girl turned around and looked at me with large brown eyes. She smiled, as if commenting on what had been said, then walked away.

Lunch was in Cole Hall, a few hundred yards from our dorm. Most everyone had gone ahead by the time Morey and I came outside. It was still strange, seeing no horizon and the land curving gently upward, overhead, beyond the wispy clouds.

"That Van Cott character, what did you think of him?" I asked.

"I kind of liked him," Morey replied.

"Why?"

"He'll work harder, do more."

"But he's no smarter than us, just wound up more inside."

"Guys like him get the prizes, because they won't let anything distract them."

"Not always," I said loudly. What Morey was saying was true but not likeable, I thought as the large transparent doors slid open and we went inside and got on line. Morey was more like Van Cott. We waited in silence as the long line moved up the ramp from the lounge, and I remembered Marisa telling me that I was not like Morey. Then what was I like? Somebody who worried a lot about himself, she would have said.

The second-floor dining area was all windows, bright with daylight, and the land was all around us, in place of sky.

I scanned the tables. Linda was sitting with Van Cott at the far end. She seemed younger today. I stared, but she was too far away to notice.

"Come on," Morey said impatiently, and we went in to get our food. I didn't like the tone of his voice. I knew that he would consider Linda a distraction, and seeing her with Van Cott had irritated him. As far as I was concerned, Van Cott could use all the distractions he could get.

We walked around the campus after lunch. It was easy to picture where everything was, because the student center and dorms were all within the inner circle of the university. Head outward from the center to get to classes; move toward the outer circle to get to labs. Walks cut across the greens between the rings. These were actually small parks, with benches and play areas for children, tennis courts, and pools.

The student center was a huge three-floor oval with a ribbon of window circling each floor. Morey and I walked into the giant lounge area. A giant holo image stood in the center of the polished red floor, offering newscasts from Earth.

Students sprawled on the floor, walked through the 3-D picture, sat in chairs and hassocks, and leaned against the walls. Multicolored sheen shorts and collarless shirts were everywhere. Haircuts were close among the boys, longer and curly among the girls.

Morey and I didn't fit, with our collared shirts, creased slacks, and longer hair.

"News," I said, crossing my arms and trying to look as if we had come here for that.

"A quake on Mercury," said a woman's giant face, "has taken three more lives among the miners. But the production of metals is not likely to be affected, Earth Authority has announced in New York. There was no public statement from the Mercury community."

Boos and hisses exploded among the students. I felt a wave of sympathy for the dead miners. How could this still be going on? People were dying, and yet there seemed to be no urgency in doing anything about it. I looked at Morey, but he shrugged.

"The Russian Commonwealth," the reporter continued, "has again claimed to be able to stalemate the Western Alliance space cyber-force, but the Far Eastern Alliance claims that this is just another bluff, despite the fact that China has given up six disputed border zones in the last six months without one return threat claim. The UN Sec-General describes the affair as just another routine probe in the give and take of peaceful *process politik*, and not a prelude to the return of armed conflict. If they had a real check threat on Western Alliance peacekeeping forces, he says, then the call committees would already be meeting to determine the move's technical credibility with a view to reaching a new accommodation of gains and concessions. But no such meeting has been asked for by either side in over a decade ..."

Most of the students were paying no attention to this part. Morey and I headed for the snack bar.

"What do you think?" I asked. "Is anyone hiding anything?"

"Who cares? I don't have time for politics." We walked through an arch and found a table near the window.

"What do you think would happen if someone were to threaten Earth directly instead of just off-planet forces?"

"Can't happen."

"Why not?"

"Because the panic of even a war scare would hurt business more than real wars have done in the past. Even if someone wiped out some bloc's space-borne force, the result would still be some accommodation. No one wants to attack Earth directly. Couldn't even if they wanted to. The beam weapons are nearly perfect. War has been impractical for some time now, but no one wants to admit it. So they go through the moves, but it's just a way of making agreements. That's why I don't care. It's a waste of time."

He stood up just as I was about to bring up the Mercury situation again.

"What do you want?" he asked. "I'll get it."

"Tall carob shake," I said, realizing that he wasn't going to give me a chance to bring it up just then.

He went to get on line, and I tried to seem as if I'd been sitting there since the year one. It was all unreal, I thought as I gazed out the tall band of windows at the sunsplashed greenery, my feet set firmly against the spinning world that humankind had set in motion out here in the blackness. We had enclosed a bit of space and filled it with dreams; but close in around the Sun, on little Mercury, people were still suffering, paying the price of providing the rest of us with raw materials to keep the dreams running....

"Over there, center of the room," Morey said as he put the shakes on the table and sat down.

I looked and saw Kik ten Eyck sitting with Jake LeStrange.

"I don't think they like us," I said.

Morey shrugged. "Who cares? Not my problem. I'm here to become a physicist."

I was still unsure about wanting to do the same, not if it meant I had to close my eyes to everything else.

We chugged our shakes and pushed the cartons into the drop at the center of the table. I glanced at Jake. He was watching me, so I nodded to him. He smiled and wiggled his fingers at me. I looked at Kik and got a blank stare.

"I'm going for a walk," I said, standing up.

"Want company?"

"Not really," I said without thinking.

He looked at me, and I felt that he didn't care; he knew what he wanted, and nothing else mattered.

"See you later," he said as I walked away.

I felt restless.

At first I wandered back along the walk to the dorm, but then I cut across the grass; any direction would do.

The air was sweet, with a touch of ozone, as if there had been a storm. Everywhere the greenery showed the skilled hand of a gardener. Even wooded areas were given so much land and no more.

I went around the dorm, climbed over the guard rail, and started down the hill toward the gym. My mind seemed blank, refusing to think about anything; seeing, breathing, and feeling would be enough. My shoes glistened from the moisture in the thick, tall grass, and I wondered about humidity adjustments inside Bernal One. Later I learned that they could make it rain or snow, just for fun.

It was a small world in some ways. No New York City crowds, more like a town. I had already seen some faces more than once.

But to the eye Bernal One was spacious. A sphere of 5 kilometers radius has an inner surface of 314 square kilometers, and a volume of nearly 523 cubic kilometers. I would have to walk 31 kilometers to circle the world at the equator. A population of fifty thousand was small in comparison with Earth's urban

areas. New York City is about a thousand square kilometers, Los Angeles thirteen hundred, but both have inhabitants by the millions.

The sunlight was warm on my face as I stared up at the landscape in the sky. Suddenly I tripped and rolled down the hill, tumbling a bit slower than I would have on Earth, because Bernal's rotation produces less than one gravity. I grabbed at the tall grass and stopped myself.

I felt a vibration in my feet as I got up, then the sound of escaping air. A piece of hillside lifted up ahead of me. The ground cracked, and clumps of grassy dirt flew into the air as a large hatch opened on power hinges.

I approached slowly and looked into the opening. Blue-white light flickered in the darkness below; a man was climbing up a ladder. I stepped back as his head cleared the rim.

"Hello there, son," he said in a piping voice, and smiled as he climbed out. I saw a stocky, graying man in green coveralls. "Didn't think this lock was still operational," he said, looking around with youthful, blue eyes. "Faulty memory."

"What are you doing?" I asked.

"Routine maintenance checks."

"Where does it lead?"

"Everywhere—on the engineering level." He looked around at the dislodged dirt. "Strange—this lock shouldn't have been covered up." He squinted at me, as if I would know something about it.

"I'm Joe Sorby, from the dorm up there."

"Bernie." He put out his hand and I shook it. "Bernie J. Kristol," he added. "At my age you grow into your first name. The rest feels left over from another time. I was just under your dorm, checking the water feeds."

"How long have you been on Bernal?"

He smiled. "I was here when the place was bare, before they put in the land and greenery. The lake was a big hole, the river a muddy ditch." I pictured what he was saying, and a great sense of excitement went through me. "They said we were crazy to build a habitat so big."

"Why did they think that?"

"Accidents, maintenance problems. More people are in danger if something goes wrong. But it's still the biggest and going strong. Where you from?"

"New York City."

"I have a son and grandson there. My house is over in North Low-G. Those of us who built Bernal got a chance to stay. They still seem to need me, even though I've trained quite a few replacements." He shook his head and chuckled. "Only trouble is they assign my trainees elsewhere as soon as I get them ready."

"You must do a good job." I found myself liking him a lot.

"You know what's what when you train with me on the service level," he boasted, but it didn't bother me. He was obviously telling the exact truth.

"How many people work with you?"

"Oh, maybe a few hundred. But when they get stuck on some problem, it's easier to call me than to work it out from scratch."

"Is it everywhere under the surface, the service level?"

"Come to my office and I'll arrange a tour. Need a job?"

"I don't think so, but I'll take a tour."

"Fine." He was looking at me closely, as if I were a special person. "Well, I have to go. Take care of yourself."

He climbed down into the opening. I guessed that he had to be at least seventy to have been here when Bernal was being built, but I couldn't imagine him slowing up until he was at least a hundred.

The round hatch jerked on its hinges and closed with a hiss, leaving a shiny cover where the grass had grown. I imagined Bernie's stocky shape loping through the tunnels, his face blasted by flickering blue light as he moved through a world of water pumps, power conduits, air shafts, and waste pipes, which functioned invisibly between the inner garden and the vacuum of space. I was looking forward to seeing it.

After a moment I noticed movement on the gym field below. A group of young women in shorts were shooting arrows at targets on the gym wall, and it occurred to me that Bernal's spin should create a coriolis effect, curving the paths of the arrows slightly right or left. Coriolis acceleration is the variation in speed as you move inward or outward from the axis of a rotating object. Hurricanes swirl eastward in Earth's northern hemisphere, westward in the southern; tubs drain in a right-handed swirl in the north, left-handed in the south. I recalled the graffiti about peeing on Bernal that I had seen on the shuttle, but I could see no curves in the flight of the arrows. Bernal was too big, its rotation too slow to create a noticeable coriolis effect.

I came to the last guardrail, where I sat down with my arms around my knees and gazed out into the magnificent space over the gym field. Unsureness crept into me again, and the future became shadowy. I was here to become a physicist and dig out the secrets of the universe. Sure, I was interested in digging out the secrets of nature, but I wasn't sure that I would enjoy the work. It was fun to think about, but I knew enough to know that it would be work. It was not going to be work for Morey; he was in love with every bit of it, and ready to put off everything to get where he was going. I knew that I probably couldn't spend the rest of my life in that way, or keep the world away. Physics was not going to be it for me, even though I could do it. Somewhere there was something else, but I couldn't see it clearly yet. I would eventually, because that way lay the truth about myself.

In the meantime I would have to go through school and get what I could out of it; and maybe it would all come to me one day soon, when that small part of me that was stubborn, and smarter than the rest, decided to speak up. It was depressing, but there was nothing else I could do, even though the answers were probably right in front of me.

The archers retrieved their arrows and started over. After the fourth time they collected their shafts and went into the gym. I stared at the empty field. Then I noticed that someone was waving something orange at me, a scarf or a light jacket.

I jumped up and waved back. The figure seemed to glide across the field. She reached the bottom of the hill and started up. I took a deep breath, and my pulse quickened as I noticed her red braids.

"Hello," she said, stepping over the rail.

"You were waving at me."

She smiled. "I wasn't."

"What were you doing then?" I demanded.

"Just twirling my jacket." She looked puzzled. "Who knew you were watching?"

"You came when I waved," I continued stupidly, staring at her skimpy white shorts.

"I always walk this way," she replied, ignoring my gaze.

"Well, sorry I waved back, I guess."

She gave me a careful look. "That's okay. What's your name?"

"Joe Sorby." She would remember me at any moment.

"I'm Linda ten Eyck."

As I looked into her wide, green eyes, I saw that she was probably my age, certainly not as old as she had acted when I had arrived. It had been her confidence, the way she had done her job.

"Oh—I was your guide when you came in from Earth." She gave me a knowing, mischievous smile.

I nodded, feeling silly.

"Well, nice seeing you ... again," she said after a silence. She brushed her lips lightly with her tongue, slipped past me, and continued up the hill. I stared, noting how beautifully her strong thigh muscles flexed as she climbed.

She didn't look back even once.

I went back to the room and punched up the titles of my course books on the desk screen. Retrieval codes popped up, and I slipped them into memory. I was all set to display texts for study. My credit was clear and all my fees had been paid. Three years later: one shiny new physicist.

Maybe Morey was right. Concentrate on one thing and get it done, whatever it takes; catch up on life later. But just then it seemed the hardest thing in the universe to do.

[Go to Table of Contents](#) |

7

Linda

It was the Friday night before the first week of classes. I was sampling course books at my desk, still determined to make a go of it, and finding nothing that would call for memory boosters.

I blanked the screen, sat back, and gazed out the window at the night glow of the Sun rings as I thought about Linda. Most students were at dorm parties, mixing and pairing, roaming the campus, invading the nearby town or hiking in the woods. The drop in gravity toward the poles was a great novelty among hikers; some couldn't get enough of it.

But the hurried atmosphere of orientation week had turned me off. I didn't like lists of things you were supposed to do, so I had kept pretty much to myself, getting up the determination to start school. Morey and I usually had lunch together, but we were apart the rest of the time.

I was about to close the drapes when Morey came in and sat down on his bed, looking exasperated.

"They think they're here to have a good time!"

"Well, it is the last weekend before classes," I said, turning my chair to face him. "Besides, what do we care?"

"Have you *seen* some of our classmates? They've brought their talking pets. They debate the points of their expensive wristphones. They brag about how many of their relatives have artificial hearts and when they're going to switch to the natural grown ones, or how many grandparents are in cold storage waiting to be cured of incurable diseases!"

I didn't much care for bioengineered pets either; they were so pathetic mouthing words they couldn't understand, just to please their owners. I had to admit that the showiness of my fellow earthies irked me.

"I thought we'd leave high school crap behind," Morey added.

"Well, the local students seem serious."

"How can you tell?"

"The Mercury situation, for one thing. There's a big demonstration planned."

"That?" He looked at me with contempt. "You think that shows seriousness? Politics. It'll be settled one way or another, but not by us. I don't have time, and you won't either."

I saw my chance. "See—you do share something with our classmates from Earth. They don't care either."

"Come on! That's a cheap shot."

"People are dying...."

"What do you want?" he demanded angrily. "Do you know what's going to happen? Those who can't make it in school are going to fool themselves into believing they're changing things, or they're going to chase each other in mad affairs. Either way, they won't get their degrees or develop the push that gets the prizes."

"Why get excited, then? Less competition for you."

He looked at me as if I'd betrayed him.

"Calm down," I said. "Things will settle when classes start."

He got up and left the room.

I let out a deep breath as the door slid shut. Then I looked around the room as if in a trance. Morey made me feel that I would never grow up. Maybe no one ever did, and all the adults were faking it; and Morey was faking the nonexistent wisdom of old age. He had done it all through high school. I knew his feelings about politics, and that he held his views honestly. I understood what he meant, but the way he applied it to the Mercury situation rubbed me the wrong way. I couldn't shake the suspicion that Morey

really wanted to be Christopher Van Cott.

I punched up 1088.

Linda's face appeared in the screen. "Oh, hello," she said, surprised. To me it sounded as if she had said, "O hollow," which showed what kind of state I was in. Morey and I had often disagreed, but it had always been friendly. Linda's smile was a welcome relief.

"Say," I croaked, "like to go out?"

"What?"

I cleared my throat. "Would you like to go out?"

"Oh." I thought she was going to laugh at me.

"Would you like to go out this evening, with me?" I managed to say.

She stared at me for a moment. "Say, how tall are you?"

"Uh, about a hundred and seventy-five centimeters. Do you want to or not?"

"I'll meet you in the courtyard of your dorm."

She smiled and blanked the screen.

The night was a bright lunar twilight with a million stars scattered across the blue-green inner surface. The polar Sun rings were a soft blue-white. I stepped closer to the rock garden in the courtyard and read that the minerals and sand were all from the Moon. Then I gazed upward, picking out the roads leading in and out of the town on the other side of the world.

"Hello."

I turned around. Linda stood in front of me. "Hi," I said. She was about my height, maybe a half inch taller.

She stepped close to me. I felt her breath on my cheek. "People from Earth grow slower," she said, smiling.

"I hope you weren't busy, when I called, I mean."

"Just about to wash my hair."

I took in a deeper breath. The knots in her braids looked even more complicated than I remembered. She looked delicious, and she seemed to like me. I felt my pulse quicken.

"I was going to take it out," she said. "Would you like it long?"

"Sure."

She smiled again. "Do you like it like this, with the braids piled on top?"

"Sure."

She touched my cheek gently. "You'll say anything. Where do you want to go?"

"How do you know people from Earth grow slower?" I asked feebly.

"Higher gravity to overcome. You know that. Where are we going?"

"How about the movie museum?" I asked, happy at my good luck.

"What's playing?"

"Let's go and see."

"Okay, Sorby, let's go." Her use of my last name surprised me.

She hooked her arm in mine, and we marched across the courtyard. I glanced at her, and she smiled as we started on the path to the student center.

"You're making fun of me," I said.

"I call everyone by their last name until I know them better." She gave my arm a squeeze.

We circled the big white cake of the student center. The museum came into view—a one-story circular building tucked away among some pine trees. We came closer and saw what they were showing:

WAR OF THE WORLDS
THE TIME MACHINE

"Old stuff," she said. "Over a hundred years old. Flat screen, messy sound."

"It's probably been cleaned up and in 3-D, but we can always ask for something else." I stopped and looked at her. "Were you expecting me to call?"

"Well—"

I could see that she was tempted to lie about it. "No, Joe," she said finally, "honestly, I wasn't."

Maybe someone else had stood her up. She was at least using my first name now.

"But I wanted you to call," she added, startling me.

"What would you really like to see?" I asked, recovering.

She put a finger to her temple and closed her eyes in mock concentration. Her tight-fitting tan denim suit revealed that she was small breasted and thin, but her small waist made her hips seem rounder.

"Maybe if they have a Bergman, she said, opening her slightly tilted eyes wide. "Got a good look?"

"What?"

She laughed, and I swallowed hard. "You've probably seen every film they have," I said.

She hooked her arm in mine again. "Let's go for a walk instead." I felt her warmth and wanted to put my arm around her. I had not gone out since breaking up with Marisa. It seemed very long ago, and I was a bit nervous as well as excited.

"Do you have brothers or sisters?" she asked.

"There's just me."

"Not even one?" She made me feel that I should have double-checked, just to be sure.

"Families are smaller on Earth." I looked up, and again it seemed strange not to see a sky. I kept seeing all the lights as stars. "Where can you see the stars?" I asked. "I mean directly."

"Why? We'd have to wear safety suits on the maintenance level, and the view would be spinning anyway. Let's go to your room. I'll show you how to punch up views from the observatory."

"I know how to do that," I said, missing the point that she wanted to be alone with me.

"You've *seen* stars," she said.

"Not the way I'd like to—outside, in a spacesuit," I replied, turning us down the path to my dorm. "Do you have any large birds here?" I asked.

"Sure—ducks and geese."

"What happens when they fly into the center?"

"Well, they *don't* get stuck. They sort of swim out."

I laughed, feeling that she was interested in me but didn't know what to make of me. I knew I was being moody, picking up on things late. Morey had upset me more than I had realized.

The ceiling flowed with light as we entered the room.

"Here, Joe, look at this," Linda said, sitting down at my desk.

I leaned over her shoulder. "There's the twenty-kilometer O'Neill colony cylinder," she said, touching the screen, "and assorted factories nearby." The view changed, but remained within the L-5 area of space. "Here's the asteroid hollow." It looked like a giant potato, cratered and ridged, but was growing green on the inside of the hollow rock, as natural as planting flowers in clay pots.

"I'd like to visit that one," I said.

"They're pretty stuck up over there. Many of the people are the original asteroid miners who brought the rock into L-5, and they've never gotten over slapping each other on the back about it."

"Well—why not? The Asteroid Belt is a long way from here. You sound like someone from Earth."

"We have a right to be critical of ourselves. It's been over twenty years since the hollow was brought in, and many of us feel it wasn't all that necessary, since we can build anything we want out here, without using old rocks."

"I read that the metals mined to make the hollow gave Earth quite a boost at the time."

"Right—Earth, not us. We still had to get our materials from the Moon. It slowed up development of L-5 for a decade, but it made us more self-reliant. Sure, we have a lot of rivalry among ourselves, but it's friendly."

"Tell me about the bad feelings toward Earth."

She turned around and looked at me. "I guess you really *do* want to ruin our evening."

I retreated and sat down on my bed. "Sorry."

"I've never met anyone from Earth," she went on, "who really understood. Don't they teach you anything there? Look—Earth gets everything from us. Power, minerals, drugs, manufactured products of all kinds. Power for the lofting lasers at the spaceports comes from our orbital Sun rigs, and so will the increased power loads for the new gravity catapults. We handle all communications throughout the solar system. Believe me, the antigrav corridors from Earth will use a lot of power—"

"But who would want to deny all this?" I said, feeling a bit defensive.

"Don't you see?" she said. "A political struggle has been going on for some time. Power is shifting to the Sunspacers."

"Well, it happens," I said, "but we're all the same humanity. We come from the solar system."

She shook her head. "Eventually, that's the way it will be. But in the meantime multinational companies are dying. Politicians are losing their bases of power and influence. No one minds the world being richer and people living better. It's the loss of power that hurts most. Whole worlds are being built out here that don't owe to Earthside politicians."

I shrugged. "More adaptable leaders will win out. It'll even out." I was sounding a bit like Morey, and I didn't like it.

"Right. Earth won't really suffer economic hardship. It's what happens in the transition that's worrying many of us."

"What do you mean?"

"The people who came out here worked hard, Joe. They built the industrial centers on Luna, Mercury, Mars, and the Asteroids. But they didn't have any real say about their lives until they had something to bargain with, in the form of deliverable energy and resources. Then the politicians lined up for power positions in Earth Authority, which gave them their base for local national power. And then it occurred to the home world that it wouldn't do to let the various Sunspace Settlements get too self-sufficient. Big decisions are still made by Earth Authority, no matter how many representatives from Sunspace sit in."

"But from what I know, the Mercury situation is the only real complaint...."

"That's enough! Do you know what's going on out there?"

"Well, I've heard it's bad...."

She was quiet suddenly.

"I'm very interested, Linda."

She smiled. "Sorry to shout. You're right, the Sunspace Settlers are doing very well—so well that Earth is recognizing their importance. But that's what makes the Mercury problem so intolerable, by comparison."

"Were you born here?" I asked.

"No, but I grew up here. My parents brought my brother and me from New Zealand when we were babies. Both our parents died in a shuttle accident when we were in high school."

"I'm sorry," I said, feeling inadequate.

Linda was looking at the floor. "Kik dropped out of school and apprenticed himself so we could stay, but I think he wanted to leave school and work in a trade anyway. We're on our own now, so he could go

back, but I think he's one of those people who can't appreciate it until they're older."

I wondered if I was the same.

"We're different," she continued, "but we're very close. He looked out for me. I hope I get a chance to help him someday."

"What are you studying?" I asked, trying not to think about myself.

"Economics and metallurgy. Materials synthesis in general. I want to help make decisions out here one day." She got up and sat down next to me. "Sorry I shouted, she said again, "but I like you, and I can't stand people I like being ... well, confused."

"I wanted to know."

She leaned against me. I slipped my arm around her slender waist, and she looked at me suddenly, her eyes wide, face slightly flushed. We wanted each other, and we both knew it.

We kissed, and I felt the tension between us drain away. Her body seemed soft and firm at the same time.

"Good?" she asked after a while, her warm breath tickling my nose.

"HMMMMMM," I said, looking forward to the rest of the evening.

"One kiss and your mind crumbles," she whispered, smiling radiantly.

I laughed, and she kissed me fiercely.

My phone buzzed.

"Probably my roommate, checking to see if the room is free." I struggled to the desk and opened the line, but not the picture.

"Hello?" I said.

"Joe? Eva and I are on a conference link," Dad answered after the three- second silence.

I sat down.

"Where's your pic?" Mom asked cheerfully.

"Busted, I guess, but I hear you fine."

"How's it going?" Dad said.

"Good. How are you two doing?" I couldn't think of what else to say. Linda got up and left the room as I waited.

"Have you guests?" Mom asked. "We've disturbed you."

"No—no, I was only studying."

Silence.

"On Friday night?" Dad said. "Has the term started?" He should have known that classes started on

Monday.

"Just looking over course books, actually."

As I waited for the silence to pass, it occurred to me that the call had disturbed Linda somehow, that she had not left just to let me talk in private.

"That's very good," Mom said, trying to sound caring. I resented the effort.

"Are you there, son?"

"Yes, Dad, I'm here." I opened the visual and saw their faces on the split screen. They tried to look cheerful as my picture reached them.

"There you are," Dad said. "You look good. No doubts, I see."

"I'm glad," Mom added.

"Tell you what," Dad said. "One or both of us will try to call at least once a week."

"I'll be here." One, two, three.

"Take care," Mom said as the picture faded.

I got up and went to the door, thinking that Linda was waiting outside. I stepped out and looked in both directions, but the hallway was empty.

"Linda," I said loudly, hoping that she had simply gone for a walk around the turn. There was no answer. I went looking for her, but it was obvious after a moment that she had left.

I was angry when I returned to the room, but not at Linda. My parents had called me to say nothing important, and had ruined my evening at the same time. Actually, I was as much puzzled as angry. Was I such bad company that Linda had taken the chance to get away?

[Go to Table of Contents](#) |

8

Classes

I walked around the campus circles that Saturday. My weight dropped slightly as I wandered away from the center line of the equator, but I couldn't really feel the difference until I had gone a ways and come back. I looked at a lot of buildings, tennis courts, and swimming pools. The crystal-clear openness of Bernal's inner space was a wonder that could not be worn out.

Once in a while I saw a sign:

NO CHILDREN PAST POINT C

Only adults were permitted to live in the lower-g regions around the poles. Children needed something close to Earth gravity to grow normally, especially if they ever wanted to return to Earth. Kids were common in the rural toruses, which were outside the sphere and free of changes in gravity. Child monitors routinely returned children who escaped into low-g zones.

The campus seemed deserted. Everyone was resting up from the partying of the night before and getting

ready for tonight's socializing. I sympathized with Morey and wished that it were Monday, even though I knew that for most students it was just a way of building up motivation for schoolwork. Morey didn't need it, apparently, and I was in no mood, after Linda, to start something that might distract me from my resolve to give college a long, hard shot.

I sat around in the student-center lounge, listening to more about Mercury on the news holos. A strike by the miners would cut off the flow of metals into Earth's industrial space, with serious consequences for the quality of life on Earth itself. The commentator also claimed that the Near Earth Space Habitats would also suffer to some degree, but I wondered if this was an attempt to shift the sympathies of a portion of the Sunspacers away from Mercury's mining community. It was true that Bernal and the other habitats needed rare metals and structural components to keep up their maintenance, but I couldn't believe that shortages would be life threatening. Another commentator pointed out that the habitats were well stocked with maintenance supplies. The profits of many companies would drop, however. No one really thought that would be a good thing, but the Sunspacers were willing to sacrifice to help their sister community.

I got up after a while and walked back toward the dorm, wondering about Linda. I wanted to call her, but why should I put her on the spot? If she wanted to see me again, she would call and explain why she had disappeared, or she would ignore me. I couldn't believe that she had been faking her attraction for me. There had to be other reasons. I would have to wait and see.

The small amphitheater was crowded on Monday morning. I found an aisle seat in the back row.

The room quieted at 9:01. My empty stomach rumbled gently, and I wondered if it was going to detect coriolis acceleration after all.

"I'm Gordon Vidich," the Physics 1 professor said in a rich bass. He was middle-sized, black hair combed straight back, looking like glossy paint from where I sat. "Most of you are preparing for a science career. How many physicists?" Half the hands shot up, most of them belonging to women. I figured I could become a physicist even if I didn't raise my hand. "A few pet peeves," he continued. "I know that you're in love with the mystery of the universe, with what's out there as well as with the bit of you that's curious about it. Existence is ultimately mysterious, but we do know a lot, short of final answers. Speculate, but *please* show *me* *always* that you know the difference between the assemblage of facts we call a theory and speculations that may or may not contain a few sparse facts. I want to see in you a *habit of mind* that will always pit theory and speculation against *some* kind of experimental experience." I pictured him peeling off his thin layer of black hair and tossing it to the class as his concluding point. "If the experiment can't be done," he continued, "wait until it can. Don't build careers on *its* *imagined* income." No one laughed at his bad substitution of income for outcome. "We had a lot of imaginary science at the turn of the century, until the public couldn't tell crackpots and popularizers from honest scientists. Anyone might *guess* the nature of the universe, or even the outcome of an experiment. The number of answers is always limited. But that does no good unless a mathematically expressed experiment pulls your answer out of the realm of possible worlds into our own." He seemed to be trying to look up at his bushy eyebrows. "Clear?"

Heads nodded.

"You must go on your knees," he shouted, "before the universe of facts, as you weave them into theories!"

I tingled from the projected energy of his spoon-feeding.

"Give your name when you speak," he followed up softly. "If I forget, it will be because you have failed to say anything interesting."

Uneasy laughter.

"Tell me the difference between gravity and centrifugal force."

"Christopher Van Cott," a voice said from the front row. "Gravity's a field, like magnetism. Centrifugal force is a product of acceleration." Vidich shrugged. "Vague terms, field and force. Why *should* there be a difference at all?"

An auburn-haired girl stood up in the third row, the same one who had gotten the better of Van Cott at orientation. "Rosalie Allport. The more general a question, the less likely it can be answered in a scientific theory. Why is a question that may or may not one day be answered, depending on how specific a chain of lesser answers we can construct."

"Good!"

Van Cott snorted.

Vidich glared at him. "That's all for now. I wouldn't want any of you to miss the beautiful day outside."

It took a moment for the class to laugh.

Chemistry 1 started at 10: 15.

Tall, big boned, and blond, Helga Akhmatova spoke in British tones as she glided back and forth, very relaxed in a loose tweed coverall.

"Chemistry's link to other sciences," she said, "its sharing of problems, has only increased with time. Physics is fundamental, of course, followed by chemistry and biology. Then we gaze across a great abyss to psychology and the social sciences. Crude divisions, admittedly, and the abyss is not all that empty. But if you can imagine a bridge of special, connecting areas, then you can get a feeling for how a complex universe, with things like persons and nations, is built up, layer by layer, out of fundamentals which themselves do not have the properties to be found at higher levels. Chemistry is one of the first hierarchies of complexity in the slow climb toward a unified science of nature." She paused and smiled. "I *suggest* that you grasp problems as you can and work from there to other things, going back only when you must. Don't be afraid of gaps. Fill them in or learn to live with them." She smiled again. "You will all do well enough, I expect."

She made me believe every word. I realized, with some uneasiness, that what she had said applied also to self-knowledge. What was the use, then, if we could never know ourselves completely?

Morey and I sat together in Astronomies, which began at 11: 10.

"I'm Muhammad Azap," the tall, slightly plump professor said, closing his mouth as if to trap the "p." He scratched his fine brown hair. "I'll assume that nothing escapes you. Wing it if you wish. Maybe something interesting has got your attention. Who knows? As long as you remedy weaknesses before term's end." He was spooky, but I liked him.

He turned sideways, as if trying to disappear. "Eight different astronomies from now until May, from visual to gravity-lens observations. What's the difference between astronomy last century and now? Don't say there are more kinds of astronomy, or that you have to know more physics."

"It's become more of an experimental science," Rosalie Allport said softly, "as we've moved out into Sunspace."

Azap nodded. "Astronomy will become a completely experimental science when human beings and their instruments can go anywhere in the known universe." He looked at us as if he had delivered himself of a great truth. "Tomorrow the hard stuff. Go to lunch."

Morey shook his head as we stood up. "A loon, but I like him."

"He must be good to be here," I said.

Linda came up the aisle with Jake LeStrange. I tensed, but they didn't notice me. Then Rosalie Allport came by, and I had a chance to see more than her back for a change. Her hair was tied in a short ponytail. She had clear brown eyes and full but delicate lips. I stared. She smiled and looked away.

"Come on, let's go," Morey said, nudging me a bit too hard.

I turned and looked at him. He smiled. "I can see how you're going to waste your time."

Human Development A, at 1:10, sounded like a course to housebreak scientific types, to give them culture and couth, as Morey put it.

We sat down four rows from the pit. Van Cott turned around in front of me.

"Say, Morey, don't you think we could get this stuff on our own?"

"Probably."

So they had met, I thought as a smiling, middle-sized man with white hair walked into the pit. He wore an all-in-one black slacks/white shirt combo with green bow tie.

"A clown," Morey whispered.

"Good afternoon. My name's Christian Praeger. This is probably the only course you'll take whose subject matter is beyond all of us. I'm not always sure myself what the subject matter is, but it has to do with making some sense of what humankind has done in its short history."

Van Cott was shifting restlessly in his seat.

Praeger smiled. "Does human history make a pattern of some kind? Is there a vision which unifies human knowledge? Einstein once said that he wouldn't try politics because it was much harder than physics—too many variables, and calling for decisions, not just understanding, where too little was known, at moments when decisions still had to be made, and where partial success was the best that could be expected.

"There will be a lot of necessary nonsense in this course, but we'll try to remove it by developing some kind of crap detector. There's no one way to make one, but it does demand the readiness to shift perspective while retaining a sense of values."

"Whatever that means," Van Cott whispered. I didn't like admitting that he had a point.

"As scientists," Praeger continued, "each of you must be able to share in the general culture, if for no other reason than that it is the culture that supports science. I know the dedication required to make a success of a career in science, to even get to the point where one has a chance at making a contribution, much less something major."

"I wish he could talk," Van Cott said.

"It's still us against them," Morey added.

"But the investment of time and patience also belongs to the burden of an artist or writer. I remember what it took for me to get degrees in physics and chemistry."

"No kidding," Van Cott whispered in surprise. "He has scientific degrees?"

"We'll be reading the so-called great books. There are only a few hundred of these. Read casually this term, but you'll find that your care will grow as our discussions become more pointed. Your interest will increase and you'll be pleased to work harder. Many past students have told me that this work complemented their scientific careers, putting their later work in a much-needed human context. I hope that you will come to feel the same."

"We're in church," Van Cott said softly.

"Quiet," I said, nudging him.

"Human cultures have advanced on more than one front at a time. Science is one of the most successful, and the one that sets the most exacting models of honesty and attention to merit. But on other fronts—"

"Example!" Van Cott shouted.

"Well, the habit of complex observation in literature, for one. Human characters are *entered*, *social systems observed*, with a personal accuracy that cannot be accomplished in other ways. An analog of experience remains that is often truer than formal histories, of how people felt about themselves and the universe. Then there's music, a realm of striving forms, pure feeling and beauty, atmosphere, rationally expressed, voicing the ineffable . . ."

I was moved by Praeger's love of his subject.

"Sounds good," Van Cott said loudly.

"How many of you have read Milton?" Praeger asked.

Van Cott laughed. "You mean that clumsy poem where all the science is wrong?"

"Can someone else answer?"

I raised my hand and stood up. "It seemed very real to me."

"Exactly the point. The cosmology of *Paradise Lost*, or Dante's *Inferno*, was the real stuff for many people, once."

"Astrology!" Van Cott shouted.

"It was a way of dealing with human fears and hopes."

"So is hiding under the bed," Van Cott added.

"I see it's going to be an interesting semester," Praeger said, completely undisturbed.

Van Cott was a go-getter; that was why Morey liked him. Dedicated as Morey was, he needed to see others swimming in the same direction. I had nothing against dedication, but Van Cott was shouting his to the world. I didn't like his style, even if he was brilliant; but that made me feel backward, even primitive, to notice his style and not his substance. I think Morey needed to see me swimming his way, but I felt

that maybe I had nothing to crow about. If I did, then maybe I'd be snickering along with the two of them and having a fine time of it.

As the lecture hall began to empty, Van Cott turned to me and grinned. "That was pretty good, Sorby." For a moment I thought he was making fun of me, but then I saw that he meant it. In his own way Van Cott was sincere.

And then I didn't know what to think.

Sunlight from the rings was warm on my face as I lay in the grass on the hillside. I thought of all the course work, but I didn't see myself doing it, even though the first day of classes had filled me with visions of new worlds to know.

I sat up and looked around. This bit of ground near Bernie's lock would make a great reading spot. I lay back again and closed my eyes. The Sun was very special here, tamed and turned inward by the mirrors of human dreams made real. The past seemed like a bad dream, the future too far away to even think about.

I liked my teachers; they made me feel that I could accomplish everything. I felt happier, just lying there, than I had ever felt before in my life, even though part of me knew that I had to be kidding myself. I didn't want to admit that what I could do fairly well was probably not what I wanted to do at all—but what was there for me to do? How can you be happy when you suspect that you no longer know what you want, and refuse to face up to the problem? I wanted to be here, to be part of the Sunspace way of life. School, I realized dimly, had only been my way of getting out here.

[|Go to Table of Contents](#) |

9

Rosalie

I felt great for about six weeks.

Fantastic classes.

Discussions spilling over into the snack bar, to dinner and late into evenings. I felt I really belonged.

Individual arguments with professors and tutors.

Akhmatova, Azap, Praeger, and Vidich loaded us with ammunition, and we fired it at each other without mercy. They fought us tooth and brain, yet managed to stay on our side. I had no time to think about myself.

There weren't the jokers and class clowns of high school, or the troublemakers who would get suspended.

Even obnoxious Van Cott seemed more human, and it didn't seem to matter what I thought of him.

For a while Morey and I became friendly with two students down the hall, David Kihiyu and Marco Pellegrini. We often ate together, and sometimes studied with them and Marco's girlfriend, Narita Sykes. But I soon noticed how much like Morey they were, and that reminded me that I was pretending to fit in, so I could get through school as I had decided. David and Marco wanted to know everything. David would sometimes wake us up in the middle of the night to tell us about an idea he'd dreamed, and Morey

would listen while I drifted off. Narita was more like Van Cott. I was sure she and Marco talked physics in bed. I knew dedication when I saw it, and I felt bad that I didn't have it; but it was easy, at first, to ignore my feelings.

The days were exciting, intense, and tiring, especially when you were forced to listen to technical talk in the showers. We took a field trip to the Research Shacks near the outer edge of L-5's volume of space, where they did the dangerous work with dense states of matter, the control of inertia, and the further applications of negative-g, which still couldn't do more than hurl a ship off- planet; but one day negative-g would push a ship directly, as part of its drive, and take us out to the stars. Doing that was a more exciting idea, for me, than understanding the physics that would make it possible.

The Shacks looked like a collection of giant tin cans as our shuttle pulled away. I felt a thrill at knowing what was being done there.

It was a short hop back to Bernal, but the Moon was as far away as Earth. As seniors we would visit the big labs on Lunar Farside; some of us would even work there one day, the recruiters had assured us.

As I gazed at Luna's dry, silvery face, I felt the vast emptiness of space, the smallness of worlds where life had fought to establish itself, and I remembered that I was still a problem to myself.

"You're not very serious about physics," Morey said to me on the last evening in August. David and Marco had just left. We were at our desks, entering the day's work. I stopped and stared at him.

"Come on, Joe, you just don't have the way of talking. You don't go after things."

"You mean I'm not Van Cott," I said nervously.

"I'm your friend and should tell you."

"Well you're wrong."

"I hope."

"What do you mean?"

"You're always running off somewhere."

"So?"

"You're not doing *enough* work."

"My grades are as good as yours!"

He clenched his teeth and smiled. "You know that doesn't mean much by itself." He had lost some weight, making him look less bearlike, taller. "You're knocking off the work quite well, even expertly, but you're not digging into it, living it the way David does, or Narita. You're not letting it take you over, the way it should if you're going to do original work."

"I keep it to myself," I muttered, feeling a bit guilty.

He shook his head. "No, it would show. A whole new world should be growing inside you. Not just the thrills of it, but the hard, close thinking. It may sound pompous to you, but there's no other way to say it."

A part of me knew he was right, but I wasn't going to admit it.

"And you're always talking about engineering. More since we came back from the Shacks."

"What's wrong with that?" I asked, even though I knew what he would say. "Our technology doesn't do half of what our science says is possible."

"But I thought you wanted physics," he said wearily, "to be at the frontiers of science doing basic work."

"Maybe engineering is for me."

He looked shocked. "That's for second stringers, Joe."

"And no friend of yours is that," I said.

"Be serious." The light from his screen flickered on his face. "You're not being fair. I thought we could talk to each other."

"Leave me alone, Morey, will you?"

"Can't take it?"

I glared at him.

He grinned.

"You changing to psych?" I asked.

"Maybe—there's a whole universe inside every skull. I didn't realize how big medicine was out here. There's bio-research going on they wouldn't dare do on Earth." He was trying to show me that his interests were wider than I thought.

"Well, I'm not going to be one of your cases," I said, feeling panicky, as if I should run around and sound the alarm for a fire or flood; *it was* an emergency, but I just sat there, staring at the screen.

"I'm sorry," he said, turning off his screen. "Maybe you're paying too much attention to politics."

I wasn't, but the way he said it made me angry. "You don't feel anything for the people of Mercury."

"I do, but I can't help."

"You could sign a petition, go to a meeting with me."

"Yeah, maybe, but my studies come first. Not a grade, *my studies*, if you know the difference." He shook his head. "It's what I came here for, Joe." He looked straight at me. "Linda filled your head with Sunspacer politics."

"I saw her only once."

"Sure," he said, leaning back. "She made you feel guilty."

"There are issues!"

He was silent for a moment. "Okay, but you don't have to throw away your career for something that'll get settled anyway."

"I'll get through anyway."

"Stubborn pride isn't enough."

I didn't have to be his kind of physicist, I told myself, but the truth in what he was saying was getting to me more than I realized. "Sorry, Joe," he said suddenly. "Maybe I'm wrong."

I swallowed hard and took a deep breath. He was only trying to let me down easy. More than anything, just then, I wished to be without body or feelings—a pure mind knowing everything there was to know, drinking in all the light in the universe. Pure minds don't have friends, I told myself as I looked at Morey's sour expression.

"You're late," Morey whispered in Astronomies the next day. "What's the matter with you?"

I stared ahead tensely, waiting for the hour to go by. Azap ran through the interstellar measurement wars at the turn of the century, when it had seemed that the universe was getting smaller as the yardsticks were revised under the pressure of some very clever criticisms. At the end of the ten-year fracas, the universe got larger again. As if the universe could care much, I thought.

I noticed Linda and Jake in the front row. They seemed to be together again. I had learned that she had gone out with me after their last quarrel. They never stayed apart for long, Narita Sykes had told me that morning in the snack bar. But that still didn't seem like enough to explain why she had run off when my parents had called, I had thought as I listened to Narita impart her wisdom.

"Jake isn't what you think he is," she had said. "He's a brilliant astrophysics student. A bit older than us, but he got a late start. He works to pay for school. His math has appeared in the journals." I didn't like the way she had rolled her eyes.

Morey was in a hurry to leave as the class ended. "Are you coming?"

I motioned for him to go without me. We were being polite to each other, but it wasn't the same. I didn't like the idea that anyone might know more about me than I did.

I saw Rosalie Allport coming up the aisle as the hall emptied. On impulse, I stood up and approached her.

"Hello, I'm Joe Sorby."

She stopped and smiled. "Yes, I know, you're in my other classes also."

"Could we go out sometime? I've wanted to ask."

She grimaced. "There's just no time. I have to study and help out in my father's bookstore in town. Sorry."

"Can I come see you there?"

"I can't stop you, but I'll still be busy."

She went past me, leaving me alone in the empty hall.

I went back to the dorm and sat at my desk, determined to study.

The phone rang.

I opened the line. "Hello, son," Dad's face said after the delay.

"Oh, hello." The screen flickered.

"You're probably very busy, but I wanted to ask if you're coming home for intersession."

"Sure!" Suddenly I wanted to escape for a little while into my earlier life, where I had not doubted the future, just to get back my sense of direction. Then I saw the pained look on Dad's face. "What's wrong?"

I waited.

"It's just that I'm taking a leave of absence from work. Everything's going into storage and I'm moving out of the apartment. I'm not sure where I'll be, so I called to tell you not to come."

"I'll visit Mom, then." One, two, three.

"Uh, actually she's looking for work herself and won't have time."

"Oh. When will you have a new address?" The thought of never seeing that apartment again made me feel panicky. I was being eased out on my own, and it felt spooky.

"Don't know. I'll be traveling."

"Will you see Mom?"

"I'm sure going to try, son."

My room would no longer be there. "But where will you live when you come back to work?" It would all belong to someone else.

"The institute will find me a smaller place, if that's what I need then."

"I understand," I said softly, my stomach drifting around inside me as the seconds dragged on.

"Can you stay there during the break?"

"Sure, no problem." I wanted to tell him that it would be a big hassle, just to see what he would do.

"You're sure, Joe?"

I nodded.

He looked relieved finally. "I have to remind myself how fast you're growing up and can take care of yourself."

"Don't worry," I said, and waited. He hadn't meant to be cruel, asking me if I planned to come home, just thoughtless maybe. I felt angry and miserable.

"I'd better sign off and let you work."

For what? The past was gone and my future was ready to crumble. I was nowhere.

"So long," I managed to say, waiting for him to hang up.

The screen winked off. My face stared back at me from the shiny surface. I looked away, drained. My bed looked inviting.

I lay down and let the cotton into my brain, hoping that I would collapse into a small black hole and disappear.

The Sun was hot on my back, and my arms were tiring as I swam toward the rock. The noise of the crowd on the crescent of white beach behind me was muted by the surf.

Foam washed over the green seaweed clinging to the stone. The girl sat up and looked at me as I stood up awkwardly on the jagged rocks. I climbed up and sat down next to her.

She smiled. Her breasts were full, her hips round over a bright-blue bikini; drops of water and grains of sand shared the tangle of her black hair. I smelled beer on her breath.

She stirred as if from a trance, stood up, and dived into the sea, just missing the sharp rocks. I admired her tanned muscles as she pulled toward shore, her long hair floating behind her.

A stocky man waded in and pulled her free of the breakers. She held his arm as they climbed a high dune.

I cried out to her and opened my eyes to the ceiling.

I'd had the dream a few times after the meeting on the rock, but that had been when I was fourteen; yet here it was again, as haunting and full of loss as ever. Would things have been different with Marisa, or if my parents had been happier? Or would the problems have been the same, but with different details?

I still had half the afternoon, so I hiked across the campus toward town. I stopped midway on the bridge and gazed down into the river. A lonely, faceless shape stared up at me from over a shadow railing.

The river curved down gently from the lake. Ducks congregated in the shallows, looking for food. A slight breeze made me shiver. I went across and entered Riverbend.

Three good-sized towns sit inside Bernal. Riverbend is the closest to the university, so named because the stream bends here as it comes out of the lake. Windy is near the south pole; in spite of its name, the air currents there are very mild. Skytown is directly opposite Riverbend across the sphere, so they're actually up in each other's skies. Riverbend is a large circle of comfortably spaced modular buildings, mostly one and two floors. Streets are laid out in tangents, making a pattern of multicolored structures and white-paved ways. Skytown is a big triangle, Windy a square. Riverbend looks like circles and squares within each other.

A trolley passed me as I came off the bridge and walked by the Sunspace Hotel. A few guests were lounging in chairs by the river. I wondered if any of these men and women were part of the delicate negotiations about Mercury, which had just begun at the hotel.

I went by the First Bank of Bernal, a small one-floor box of glass and brick that housed the credit terminals, and continued up Main Street, past the drugstore, a clothes outlet, and a deli. Arthur's Hart, a bar and sandwich shop, stood on the next corner, next to the only bookstore on Bernal.

I whirled through the archaic revolving door and stopped just inside a giant cube with book-covered walls. There was a catwalk halfway up to the ceiling. Ladders and footstools waited conveniently, but I saw no customers.

I looked up and saw Rosalie coming around the cat walk.

"Are all these books real?" I asked.

She leaned over the rail and smiled. "What are you doing here?"

I shrugged. "Come to see you, I guess."

She frowned and started down the ladder. I watched her, noticing again how pretty she was. She stepped down gracefully and turned to face me. I wanted to kiss her.

She seemed embarrassed by my attention. I looked around at the books.

"Most of them are copies," she said impatiently, "but we can fax any volume in any language ever published."

"Ever?"

"If Earth has copies in memory storage, with a plan of the original binding, or if someone somewhere has an actual copy we can examine. At the beginning, you must have a physical copy to reproduce. Searching out books that were not stored is quite a job."

"I can dial up anything really important on my screen."

She knew I was baiting her, but she remained serious. "A lot of people still want the actual book, especially an exact copy of the original edition, which may no longer exist. You'd be surprised how few books have survived from the last two centuries. We can even reproduce the antique smell of the original volume."

"How's that?"

"We call up the pages, run them on the same kind of paper and bind downstairs, as many as needed. Printing is nothing, the style of printing and binding everything. And our copies last forever. No acid yellowing or crumbling of paper."

"You do it by hand?"

"Of course not. But the machines do need programming for accuracy, and that takes a good eye."

"You don't sell many," I said.

"More than you might guess. But they're too much to store, so many people have brought books back when they couldn't keep them. They make good display. We do have steady customers. Some people really hook on collecting, once they realize that they can have almost anything."

"That's dumb. How many times will a book be opened after it's been read? You can always get it again from a memory bank. It's more efficient."

She shrugged. "You don't understand collecting. There's a man in Windy who had us run off a set of Ace Double Science Fiction paperbacks from the middle of the last century. He won't stop until he has all science fiction to 2001."

"Want to have a late lunch?" I asked politely.

She smiled. "I go to Arthur's next door." I was staring into her clear brown eyes. She seemed bustier than I remembered. She was wearing a sheer white blouse and gray slacks. The skin on her neck seemed very soft.

"Well, are we going?" she asked.

Arthur's Hart was empty, except for two older people down at the far end of the bar. We sat down at a corner table.

"Two beers and ham clubs," Rosalie said as the bartender noticed us. "Is that okay, Joe?"

I nodded and she punched in the order on the bright call board in the center of the table. "You like the store?" she asked.

"It's great," I said.

"Dad's hobby, really, but he doesn't get much time from his job as biblioprogrammer at the university, so I try to help. He locates books through the terminal links with Earth. He's always looking for books to redo for his idea of an ultimate library—the most important books from every age. He doesn't think there should be more than about a thousand volumes. He's always weeding and replacing."

"I'd rather read than own books."

The roller brought our food. We removed the plates, and it scooted away. I swallowed some beer and took a bite of sandwich.

"Dad once took a trip to Earth to buy a few actual first editions. He says if there's ever a war on Earth, computer memories might be wiped, so there should be physical libraries somewhere, as a hedge."

"We'll never have wars again," I said.

"I'm not so sure."

"Earth is too well off."

"Natural disasters can threaten memory banks. Some physical books will always survive." She glanced at the timer over the bar. "Can we have news?" she called. The bartender nodded.

The wall at the end of the long room grew hazy. A holo of New York appeared.

"My hometown," I said pompously, hating my voice.

"Really?" She smiled.

The caster appeared against the skyline. "Good afternoon. I'm Keith Lamas in New York. With thirty lives lost in the newest quakes on Mercury, the miners have called a strike, cutting off all heavy-metal boosts to Earth Orbit until a date is set for the construction of an orbital habitat around Mercury. The surface of the planet, they claim, is too dangerous for them and their families, and will become even more hazardous if mining operations are expanded in efforts to tap the planet's metal-rich core with nuclear explosives ..."

"Couldn't they build their own?" I asked. "They have the energy and resources to build a thousand habitats."

"It's not that easy, Joe." She seemed disappointed by my comment, as if she wanted to like me but I had made it harder. "They don't have the time or the work force of specialists to do it quickly enough, without waiting a decade to move in. The habitat would have been ready by now if Earth had kept its promise back when."

"How many people would it take?"

"To do it quickly—maybe five thousand skilled workers and tons of machinery. I'd volunteer."

"The Asteroid Belt has repeated its support for Mercury's demands," Lamas continued, with a shot of Mercury and the Sun at his back, "even as negotiations have broken down at L-5. The other Sunspace Settlements are expected to follow suit...."

"That's us," Rosalie said.

"Earth won't go to war," I said.

She laughed. "Earth is too dependent." She sipped her beer. "It will have to give in if Mars, Luna, the Asteroids, and the Sunspace Settlements all support Mercury."

I didn't like accepting Earth as the villain, even though it probably deserved it. So I took the other side, just to see what Rosalie would say. "What can they do?" I asked. "Go to war? Everyone would lose."

She touched my hand, as if I were a hopeless dunce. "Joe, the truth is that Earth takes a lot from the rest of the Solar System and doesn't keep its promises. Not because it's entirely mean, but because it's easier. Earth doesn't want to know how people live elsewhere, as long as it doesn't have to tear up its own environment, as long as it gets its metals, electronics, power, from the satellite grid—especially the biotechnology that keeps the old politicians alive. The off-planet death rates are incredible for an age when people can theoretically live forever."

"People die on Earth too," I said feebly. "You can't blame every accident on Earth."

She bit her lower lip and stared at me. "Accidents are one thing. Sunspacers are willing to take risks, but not to throw away their lives!"

I'd never seen people get hurt or die. It bothered me that it was happening somewhere, needlessly, while others gained by it. People on Earth lived decent lives because of what the Sunspacers had accomplished. If the sky frontier had not been opened, Earth might now be living a double life—*islands of prosperity* would exist in a sea of famine and human die-off. What kind of people would be living on the islands of prosperity? I had grown up believing that such things no longer happened. I'd heard about it, but always with the idea that it was about to be taken care of. But the open wounds were still with us, and I felt my anger getting ready to break out.

"But what can we do about it?" I asked, echoing Morey.

The news was ending:

"...and the last slugs of refined ores will reach Earth orbit in three months. There will be no more if the miners stop the flow. This is Keith—"

The bartender turned off the holo.

We finished our lunch uneasily.

What can Bernal do?" I asked.

I could see that she wanted to answer me carefully. "The town councils will support the miners, of course, but we can do much more—refusing to service the powerstat beamers in Near Earth Orbit, for one thing, or to run the ore tugs that guide the slugs coming in from Merk, so even the ore still on the way would be useless to Earth. The thirty communities of L-4 and 5 are a whole country. Space travel would stop without us. Earth would be quarantined. We could seize any ship coming up into Earth Orbit. Earth

will give in for the biotechnology alone. Its whole medical system depends on substances manufactured in zero-g. A lot of powerful lives would end, just when they thought they might live forever."

"It would be murderous to cut off a world like that," I said.

"Murderous! Look at Earth's history of killing. Millions of species died out before 2000. A good portion of the planet was returning to desert by then. The planet is still heating up from all the atmospheric pollution. Do you know how many people died of starvation, how many failed to reach their normal body weight and intelligence for lack of food?"

"You don't like Earth much," I said.

She stared at me without blinking. "That's not the point, Joe. Earth is still doing it. Those miners have been asking for a decent place to live for more than twenty years now."

"I know."

"Keep it down," the bartender said.

"It *was* promised," she continued more softly. "The Sunspacers saved Earth's ass at the turn of the century—with energy, the industrial work that couldn't be done on the planet, with resources and medicines. And do you know what people still think? That *they* did it, and that convicts don't deserve better anyway."

"Well, we're all human beings . . ." I was about to say from Earth. "So what's holding things up?"

"Our reps are still a minority on Earth, but UN Earth Authority will approve the Mercury project, no matter what it costs, or risk a major break between Earth and off-worlders."

"Didn't sound like it on the news."

"The threat of the strike will push things right. Haven't you seen the holos of Mercury, the conditions in those underground hovels? Where have you been?"

"I've seen them. But what can I do personally?"

"Do you really want to know?"

We were silent.

"I know what's right," I said finally, not wanting to seem uncaring.

"Sorry, Joe, I didn't mean to shout."

We got up and walked over to the register, where she punched in her payment. "This is on me," she said.

We came outside. "I've got to get back to the store," she said. Her eyes searched my face for a moment.

"Can I call you sometime?" I asked. She touched my face gently. "Sure." Then she turned and went into the bookstore.

The river was turning a deeper blue as I walked back across the bridge. I felt that I was exactly what Rosalie had taken me to be—an overprotected kid from Earth, an only child let loose reluctantly by a jealous planet. I tried not to think as I looked around in the fading light, surprised again by my own existence. I was a traveler with no memory, newly arrived in a world where everyone seemed to know

more than I did. No wonder I didn't know what I wanted. I was growing up, moving from past to future, so how could I be expected to see ahead? I was still too close to the beginning.

Bernal's inlay of greenery darkened. Lights blinked on in buildings and shot down roadways as I hurried back to the dorm. It seemed that the worlds could solve their problems, if they wanted to; and so would I, once I decided what was important to me. Adults are degenerated children, Morey liked to say. Spooked by fear and doubt, they lose the imaginative flexibility of their youth and freeze up, hanging on to what they have, unable to decide new things. Was that happening to me, before I'd had a chance to grow up?

The phone rang as I came into the room.

"Joe?" Linda's voice asked as I opened the line. There was no picture.

"Hello, I'm here."

"May I talk to you?"

"Just turn on the screen."

"I mean personally."

She had quarreled with Jake, and I was to be the backup again. "Joe?"

"You mean tonight?"

"I'd like to explain."

"I really can't..."

She broke the connection. I thought of calling her back, but decided against it. She was using me for something, it seemed, yet I felt she liked me also.

I went to the bathroom and washed my face with cold water. I stood there looking at my face in the mirror, wondering how I could figure Linda out if I couldn't understand myself very well.

The phone was ringing when I got back to the room.

I sat down and waited for it to stop, but it kept ringing. Finally I opened the line. "Oh, hi," I said, surprised by Rosalie's smiling face.

"Maybe we could get together this weekend?" she asked. I nodded.

"Are you going home for the break?"

"I don't know," I managed to say. "My folks are having problems, and they're moving."

"You're welcome at my house."

"That's very nice of you, but I can't promise."

"What's wrong?"

"Nothing much."

"Where's your roommate?"

I shrugged. "Working on his future somewhere."

"And you're not?"

I smiled. "How'd you guess?"

She was looking at me critically, but with concern. "See you this weekend." Her face faded away.

[|Go to Table of Contents](#) |

10

Problems

I did my work in a kind of trance that week. The good thing about this was I didn't notice the difficulty of the material, learning as a matter of habit, caring less each day, taking no pleasure in it. Morey was having fun, even when the work was very hard. I envied him.

Morey studied away from the room, so I saw him only when he was asleep or going somewhere. He didn't want to argue with me anymore, it seemed; his studies were more important. He was right—I did my work out of pride, because

I refused to give up.

I passed Kik ten Eyck in the student center one afternoon. He gave me a puzzled look and kept walking. I saw Jake and Linda from a distance a few days after she called. Kik, of course, probably thought I wasn't good enough for his sister, since I was from Earth, but I didn't take it personally; he would have thought the same of anyone from Earth. We were all childish, overprotected types. Kik, being a tough, mature Sunspacer, preferred Jake, who was more like himself, the brother Linda loved. It probably disturbed Kik that Linda had showed signs of being attracted to me. Still, it seemed I was missing something somewhere.

I spent a lot of time on the hillside, gazing up at the rooftops on the other side of the world. The fresh air, the soft sunlight on my face, the flowers in the grass, the impossible river rising from the lake, made my doubts seem a bad dream ...

Something crouched in the grass near me. A Scottish terrier's beady eyes were staring at me intently.

"Electromagnetic!" the animal squeaked, repeating some physics learned from its owner. "Explain ... vectors, hah, hah, hah!" It laughed mockingly.

"Go on!" I shouted.

"Good-bye!" the dog cried and rushed off into the tall grass, leaving me a bit disturbed.

I lay back and wondered about the terms ahead, escaping into a future where I would be full of learning and under my own command. I pushed forward through time, watching the Earth-Moon system racing around the Sun, speeding the cosmic clock ahead into distant ages, my back pressed against the grass in this light-filled hollow.

You can have anything you want in your mind, but the trick is to make dreams happen outside your head, so they become as real as the habitat around me. Still, wishes have to start deep inside you to be any good.

Rosalie found me out there, late one afternoon, when I should have been in class. She sat down next to me and took my hand.

"I don't want the distraction of getting interested in someone, not while I'm in school."

I sat up. "So why did you come out here?"

"I was worried about you. You haven't been to classes much, and that began to distract me also."

"It's okay, I'll have the grades."

She gave me an exasperated look, and I knew what she wanted to say. *Typical Earth boy .No ambition* . Kik was the kind of guy for her, I thought.

"I just don't feel the dedication for physics when it comes to work. The idea appeals to me in my head, but I don't feel it."

"Maybe you're just lazy."

I laughed. "If only that's all it was. Look—it's the wrong thing. Might as well admit it early."

"Maybe you need some time to think, Joe."

"Who knows? I'm not that unhappy about it." But when I looked at her I realized that there wasn't much in me for her to like. I hadn't done anything, and it seemed unlikely that I would.

Rosalie and I started going out on Fridays, rationing our time together so it wouldn't interfere with school. She seemed a much warmer and more sensitive person than Linda, but probably just as strong. She was determined to get what she wanted—an education before a career, in contrast to those students who thought of the university as the bottom rung of a scientific career.

I wasn't sure what Rosalie expected from me. She had a way of searching my face with her eyes for clues about my feelings. I was a little afraid she would discover a person neither of us would like.

The term ended on October 10. Morey and I got A's in our courses. He was very smug about it. Not bad for a couple of earthies.

"Good going, Joe," he said, but with a hint of doubt.

"Just a first term." Ro had pushed me a bit, but I still wasn't a true believer. Her encouragement had helped, and I felt a little guilty. True believers sat around to all hours, plotting how to seize the holy grail of physics. It all depended on which problems they selected to solve; pick wrong and you were finished. So how could I do anything? I had no beastie in sight; I only got grades.

The campus became a ghost town. The Earth kids went home for two weeks; the locals stayed in their towns. I was alone in the dorm, except for some wandering maintenance people and Carlos Ramirez in 107. I tried to talk to him, but he was hard at work for the next term and didn't want to waste time. He was an orphan, studying physics on a small income from an insurance trust. He had no one on Earth except the bank. His grim determination made me feel worse about myself.

Rosalie came and stayed with me for a few days. We slept late and went swimming in the lake before noon. Ramirez always gave us a few dour looks when we came back.

"I don't think we're setting a good example, Ro said one day.

"Don't worry, he's tough. So how are your parents?" I asked as I changed my clothes.

"There's only Dad and me. He's fine."

"Oh."

She saw my hesitation. "My mother isn't dead or anything, Joe, as some people assume. Dad had me alone."

"But you have genes from two parents, don't you?" I asked, relieved that it was nothing sad.

"Sure, but the female were made up to order." She laughed. "There's no Mom hiding somewhere for me to wonder about. I know you're more used to it on Earth, but it's getting quite common out here in the habitats. After all, we pioneered the biofacilities decades ago." She smiled. "I'm healthier than chance combinations, since at least half my characteristics are handpicked. By Dad, of course."

I knew about it, but she was the first I'd met. "Were you born from a host mother?"

"No. Quality-controlled womb. What do you think?" She stepped out of her damp suit.

I put my arms around her. "You make me very happy," I said.

Ramirez pounded on the wall a few times before we went to lunch.

The Mercury talks resumed on October 17. Ro and I were hoping that there wouldn't be another quake before the negotiations were concluded. I didn't really like the idea of negotiating about such things; what was right was right. Negotiations seemed just a way for Earth to see what it could get away with doing.

I came out of the bathroom one morning and saw a familiar shape walking away from me down the hall.

"Bernie!"

He turned around and smiled. "Joe. How about seeing a bit of the engineering level?" His memory was perfect.

"Sure, when?" Ro was at the bookstore, and I had nothing better to do. The break from school had put me in a good mood.

"We can go right through the dorm," Bernie piped, "along the water system."

He led me down the stairs into the basement, where he opened a large hatch in the utility area. I followed him down a spiral staircase. We came out into a tunnel. Guide lights went on overhead.

We got into the open track car, and it whispered off down the passage. The overhead guide light snaked ahead of us, darkening behind us.

"We're running along the water and drain pipes," Bernie said. He took a deep breath, then another.

"What's wrong?"

"Nothing. But sooner or later I'll have to have a new heart grown for me. Doc says I need a general cell scrub and 'juvenation. Getting old."

"Nobody's really old before a hundred nowadays."

"That's what they teach, but you'd be surprised how many people die in their eighties."

"Do you feel old?"

"Sometimes."

There wasn't much I could say to that. I liked him, and felt that he liked me. He'd remembered our meeting on the hill, and was eager to show me around.

"You can't see much down here in one day," he said.

"That's okay." I looked back into the dark tunnel. "Where are you from, Bernie, originally?"

"Earth. Had a son and daughter there, lost a second wife, and spent twenty years in prison. Learned enough to make myself useful when they sent me out to help build this place."

"What were you in for?" I asked, wondering if he had killed his wife.

"Computer bank theft. They never found the money."

"What did you need it for?"

"Things were worse in those days. I had a common law wife who ran away and left me with two kids. I set the kids up for life, but the money couldn't be traced back to me. No one knew who they were or where. I had no time to raise them. I set it all up, so that when they caught me my kids would have enough. The money disappeared the day I transferred it. No one cares any more."

"You don't mind telling me?"

"It's in my files now. I like you well enough." He looked up. "We're under the lake now."

"The sphere gets its water from the lake, I take it."

"Right. It's used to irrigate the land, since we don't get much rain weather. Land inside one of these can get very dry. The system releases water directly into the ground at thousands of points, then it drains through the ground back into the lake. Those switches have to be checked routinely and replaced when the computer says so. I can let you off at the student center on the way back, if you like."

"That's okay."

"If you're ever free, come and work for me. I'd be glad to teach you what I know."

"Are you serious about that?"

"It's the second time I've asked. Remember?"

"Don't you think I'll stay in school?"

He gave me a sly grin. "I can spot the moody ones. Seen them come and go. Make good apprentices. It doesn't matter about school. You can work a term and go back."

"Oh." I was surprised at how sure he was about me.

"You know where to find me," he said as the car slowed to a stop near a dark exit. "Give me a minute here. All I have to do is plug in an automatic switching unit. There are spares right here on the shelf. Then I'll shoot back with you to the student center."

I wanted to see more. "Next time," Bernie said, sensing my disappointment. It bothered me a little to

think that anyone could figure me out, especially since I was having trouble doing it myself. Were people pretty simple when they were young, growing more complicated as they grew older?

Morey came back on the twenty-third. "You're a day early," I said almost accusingly.

"Got to get a good start. What did you do?"

"Walked around a lot. Kept to myself."

"See Rosalie Allport?"

"Once or twice," I said reluctantly.

"I'm glad to be back," he said, sounding like his old self. "Mom kept asking if I still got the whoopsies in space. She kept saying the word. They dragged me around to their friends. At home I was the kid with the whoopsies, but in front of their pals I was the wonder brain from space. A few of their pals dislike Sunspacers. Never noticed it before. They see them as misfits who can't hack it on Earth. There's a lot of hate about the Sunspacers siding with the miners. You wouldn't have liked it. I had to come back early."

He was glad to see me. And I was happy to see him, I realized. Maybe we could get along after all.

"Did you get sick this time?" I asked, needling him.

"Funny about that, I didn't."

The second term began. We had the same teachers for the second halves of the first term's courses. I worked very hard, trying to keep to my resolve.

There was a knock on my door one afternoon in the first week.

"Come in!" I shouted.

The door slid open as I turned around, and I saw Linda. "Will your roommate be back soon?" she asked, stepping inside. The door slid shut behind her.

"I don't know."

"What are you reading?" she asked, smiling nervously.

"*War and Peace*," I said, puzzled. "Leo Tolstoy."

"I've read it. It's long."

"I know."

She looked at me uncertainly. "Joe, I want to explain why I disappeared that evening."

"You don't have to."

"I want to," she insisted.

"I understand about you and Jake."

"It's not just that. When news came that my parents had been killed in the shuttle accident, it was a call from someone who sounded like your father. I thought you were going to hear something bad. I know it's stupid, but I can't listen when I know kids and parents are going to argue. It all got mixed together that

night. I'm sorry. It's been four years," she continued, "but it seems like yesterday. Kik and I have only each other."

"You must have loved them a lot," I said, standing up.

She came up to me and kissed me. "Joe," she whispered. "I wanted you that night. But that's all it was."

I stared at her. She smiled and put her arms around me, and we kissed again. Her lips softened, and a flush came into her cheeks. "It's unfair," she whispered, pressing against me.

"What is?" I managed to ask.

"You're too yummy," she mumbled. We stumbled and fell on the bed. I tried to keep from laughing, not wanting to spoil her mood. No one had ever called me yummy. I felt like a dessert.

The door buzzed, but we ignored it. Then it slid open and I heard Rosalie say, "I thought I'd surprise—"

She stopped short and moved backward, triggering the door before it could close. I tried to say something, but she turned and walked out. The door took forever to close.

"I'm sorry," Linda said after a moment. I moved away from her and sat on the edge of the bed.

"I'm sorry," she repeated, moving to sit next to me.

I took a deep breath. "It's okay."

She touched my arm.

"Go make up with Jake," I said resentfully.

"Don't be angry. It just happened, not because of Jake. I kept thinking about you ..."

"Please go."

She kissed my cheek and stood up. All I wanted to do was find Ro and change the hurt look on her face.

The phone rang. I waited for the door to close after Linda, then I rushed to the desk, hoping that it was Rosalie calling from the lounge.

I opened the line. Dad's face stared at me.

"Hello, Joe," he said after a moment.

"Oh, hi."

"What's wrong?" he asked after the delay.

I shook my head. "Just expecting another call." One, two, three.

"I won't keep you. Just wanted to tell you that I've got a new place here in New York and I'm back at work, so your coming home for Christmas won't be any problem."

"What about Mom?" One, two, three.

"It's over, I'm afraid," he said heavily, "but she'll be here to clear up some business, so the three of us will be together."

"I don't know. Let me call in a day or two."

"What's to decide?"

"It's just that I have to see about a few things." I waited.

"Sounds like you don't want to come."

"Well, I didn't expect to!"

His expression caught up with my words. "What's wrong?" he asked softly, looking hurt.

"Nothing. Look, I'll call. There's plenty of time." One, two, three.

"I'll have to know, son."

"Yeah, I'll call."

He faded.

I called Rosalie. Her face appeared and disappeared. I touched in her number again.

"Ro, please!"

She stared. I had only a moment to get through to her.

"What is it?" she asked coldly.

"It's all a mistake!"

I explained nervously; it all sounded like a lie.

"I just don't know," she said finally.

"It was just a stupid accident, Ro!" I should have told her that I loved her, but suddenly I was uncertain. Here was my chance to be alone again, to think only of myself and what I would do with my life. Besides, what kind of person was she to doubt me so easily? Maybe I didn't know her at all.

"I'll have to think about it," she said, as if picking up my uncertainty. Maybe she was thinking the same thing—here was her chance to be rid of me. We hadn't had all that much time together. Did you ever try thinking in two opposite directions at once, and believing that you could do it? I was trying to live in two directions at once, studying physics but wanting something else; the thing with Linda probably looked like more of the same to Rosalie.

"I'll talk to you another time, Joe." The skeptical tone of her voice dismayed me. Maybe she was right to doubt me. She'd found me out, even though the scene with Linda meant nothing by itself.

I felt naked and alone.

I tried to catch her in Astronomies, but she always managed to leave by another exit. I tapped notes into her terminal, with no reply. It made me sick to think that I would never be able to set things right. How could this be happening?

I couldn't sleep, and began to miss more classes. It seemed that a stranger was doing the work when I studied. When I could sleep, it was an escape. Rosalie's sudden rejection of me had struck deeply. I had balanced my doubts against each other and avoided taking a good look at myself, at what I was or could

be. Rosalie, I felt, was punishing me for being dishonest with myself.

"You've got to snap out of it," Morey said one Monday afternoon. He had come back from classes and found me sleeping. "You'll fail some finals and they'll kick your ass out."

"I can make up a few weeks easily."

"What's happening to you?"

I sat up on the edge of the bed. "I need time to think. Maybe I shouldn't have come here."

He tried to be encouraging. "But you can do the work. They wouldn't have let you in."

"Mistakes happen. You were right, I just don't care. It's not just Rosalie. She was right too, I'm not going anywhere. The diploma won't mean a thing, even if I get honors."

"Come on! You're not just any dodo." But he couldn't hide the contempt in his voice.

"Go away, Morey," I said, standing up and adjusting my underwear. "I don't have to listen to this crap."

He laughed at me. "You should see yourself. So tough."

I pushed him away. He staggered back.

"You think there are no other kinds of people in the world besides you," I said.

"Of course there are. Muscleheads like you."

"You—" I started to say, trying to keep up my steam against the sense of shame flooding into me. "You think there are heads and hands, and you're a head. The rest of us are just unfortunates."

He looked a bit embarrassed. "Well, you could be a head, but you won't be."

"Other things take heads too."

He grimaced and left the room. I felt that he had given up on me completely, and that woke me up more than anything. I didn't have to be like him; I could try to be myself.

I went over to Goddard Hall after dinner and threw a pebble at Ro's third-floor window. She turned away when she saw me, making me feel abandoned and useless.

I tossed another pebble. Kea Tanaka opened the window. Her long black hair swung forward as she leaned out. "Go away, Joe, she won't talk to you."

"I've got to," I shouted, hoping Ro would hear me. "Help me," I half whispered.

She shook her head, and I hated her unreasonably.

"Try!" I urged.

"She doesn't want to see you." She waved a plump arm at me. "Go away."

Rosalie appeared next to her and closed the window without looking at me. I turned and walked away. What had it been like for Mom and Dad, who had spent so many years together?

"Joe!"

I turned around. She was standing in front of the main entrance. I hurried over. She took my arm and led me to a nearby bench.

She looked at me carefully as we sat down.

"You still don't believe me, do you?" I asked.

"I do, now, but you gave me a scare. I know Linda, even if we're not close friends. I think she doesn't break off with Jake because losing him scares her more than loving him. Don't forget, she lost her parents. She's the same way with Kik sometimes. They'd do anything for each other, but you'd never guess it from the way they act in public—very quiet or taking jabs at each other. Jake's older, so he wants Linda to make her own decisions, to stay with him because she wants to. Unfortunately, this lack of pressure on his part sometimes gives her too much space to flap around in, and she thinks he doesn't want her. Jake's been Kik's friend for a while, so he understands her and can see things coming. Linda's afraid of losing anybody she loves too much. She goes out with others to test Jake, and to see if she loves him."

"Well, I think she liked me a little...."

She smiled. "But not enough."

"I guess. Who knows? ..."

"Look, Joe, there are more important things. What's bothering you? Don't you like school?"

"It's hard when you have the feeling that it's all not for you."

"Are you homesick?"

"Not really. I do feel out of place sometimes. The reasons I'm here don't seem to go through me—they don't reach down deep, as they do with Morey. He's having fun, even when the work is hard. I feel jealous. The work is interesting, but I take no pleasure in it."

She was quiet for a moment. "Why don't you do what I do, Joe? Get the grades and don't worry so much what you'll amount to. Don't freeze it all up in advance. Give yourself a chance to grow."

"That's what I've been doing," I insisted. "But Morey says that won't make me a star physicist. He makes me feel like a phony."

"You don't have to be Morey, Joe."

Marisa had told me the same thing once. "You're right, but what am I going to be? Is this all there is?"

"Stop being anxious about it first."

Rosalie still seemed to think that I wasn't a complete waste of time, but I had shaken her confidence in me for a while. I had been too wrapped up in my own fears to notice that she had made no sweeping judgments about me.

"Was there a girl back home?" Rosalie asked.

I nodded. "She broke it off."

"Why?"

I hesitated. "Said I was too wrapped up in myself, as if I were something special. I guess my going away to Bernal only convinced her more."

She was smiling faintly. "What do you think about yourself now?"

"Same thing I did then," I mumbled. "That I could do something special. I know it sounds stupid."

She kissed me. "You're special to me. The rest you'll have to see about."

We kissed again. "I didn't want to hurt you," I whispered, holding her close. "I love you very much."

"Same here," she whispered back.

We sat in silence for a while, and I decided to tell her. "I almost punched Morey today—I never hit anyone even in fun before, at least not since I was a little kid. Can't believe I shoved him like that." I looked at my hands as if they had betrayed me.

"But why?" she asked, not sounding too surprised.

"He was talking to me like a parent. I don't know—maybe he's right about everything, but I'm afraid to admit it. Guess I'm pretty screwed up...."

White clouds drifted in the bright, starless evening of the hollow. I wasn't going to solve anything right away, but with Ro next to me my fears didn't seem quite so important.

"Come spend Christmas with me," Ro said. "You won't have to go home or stay at the dorm. We'll put you up at the house."

"Okay."

"Dad's a great cook," she said.

I felt bad about Morey. We'd never even wrestled in fun. He'd probably never talk to me again, I realized. But I also felt a bit relieved; it was all out in the open now—I didn't have to follow in his footsteps. I could try to make my own, even if I didn't know where they would lead.

Morey was packing his stuff when I got back to our room the next morning.

"There's a place for me on another floor," he said. "Kid's roommate dropped out." He looked at me for a moment, clearly suggesting that I would flunk out also, then went on with his packing.

I felt anger and hurt at the same time. I wanted to apologize, but I couldn't, and it was too late to do any good.

"It's just as well," I said, trying to sound unconcerned, "I was planning to move out next term anyway."

Morey didn't reply, and I felt miserable.

[|Go to Table of Contents |](#)

11

Holidays

I wasn't able to reach Dad, so I left him a message. He called back a week later. "Joe, what is this? Why

can't you come home for Christmas?"

"I told you. Rosalie asked me to her house."

I waited.

"You didn't mention it when I talked to you."

"I forgot. Maybe I didn't know then."

He stared at me. I watched his expression catch up with my words. "That's not like you, Joe. What's going on?"

"You probably weren't planning much anyway."

He was silent for much longer than the delay.

"Sorry," I added, knowing that I was punishing him for not letting me come home for intercession.

"If you won't come, I can't force you," he said finally.

His face faded away. I felt relieved and saddened.

I went to Bernie's office on the second floor of the student center, hoping to talk about taking a job with him during the next term. The message plate on the door read that he was in Riverbend Hospital for an indefinite stay.

It was a Saturday morning, so I called Ro, and we arrived at the admissions desk an hour later.

"He's in cold suspension life support," the male nurse told us.

"What happened?" I asked nervously.

"Heart—he'll have to stay until his new one is grown, and for a complete cell scrub renewal. He should be out before Christmas. Do you want to see him?"

"How can we?" I asked, puzzled and afraid.

"Are you friends or relatives?"

"Friends," Ro said. "Joe knows him better than I do, but everyone has heard of Bernie at the university. He's a legend."

"Yes, I know," the tall nurse said. "Come this way. He'll need to hear from someone. We haven't been able to contact any of his family."

We followed him down a long corridor, through a few heavy doors, and into a large monitoring room.

"Number six," the nurse said, pointing to a screen.

I took a deep breath as I saw Bernie's face. It was composed, as if he were dead.

"Say something reassuring."

"Can he hear me?" I asked.

The nurse nodded. "He'll pick it up at a deep mental level. It helps calm the body, we've learned."

I leaned close to the pickup. "Bernie," I said, choking up, "this is Joe Sorby. I want you to get well soon, so I can work for you ..."

"His signs are calmer," the nurse said after what seemed a long silence. "He must like you."

"I've met him only a few times," I said, "but we talked a lot."

"Come back when he's through the replacement. It'll be routine. We're a bit puzzled why he didn't come in sooner. You'll help his recovery."

"Haven't you heard from his kids on Earth?" I asked.

"Not yet."

I looked closely at Bernie's face, wondering what he might be dreaming. Had he grown tired of life and decided to die when his body failed? I couldn't believe it. He was obviously needed. Or was there something I didn't know? "Get well," I repeated, swallowing hard, afraid of my feelings. We had talked about more than I realized.

"You're drawn to him," Ro said as we walked back across the bridge from Riverbend.

I looked around. "I guess I admire what he's helped do here. He can see what his life has been for. It's all around him, and he still helps keep it going."

"You'll probably enjoy working for him. I can tell in the way you say it." She smiled at me.

"Is it a good hospital?" I asked.

"Sure. His kind of recovery is routine, although he shouldn't have let it go so long. You won't miss school?"

"It can wait."

"It's not the best I've seen," Fred Allport said as he adjusted the 3-D holo of the Christmas Tree from New York City's Rockefeller Center. He had the whole scene reduced to fit in the corner of the living room. The people ice-skating under the branches seemed like toys.

I had given Rosalie a bracelet, and had received a shirt. Fred gave us a miniature set of the Oxford Classics. Ro had stopped me from buying him anything; he had insisted that our spending time with him would be enough.

Fred was a great cook and a nonstop talker, and he never tired of showing me his books. The visit took my mind off everything for a week. I felt that he wanted me to like him, and that he was very pleased with me, for more than Rosalie's sake.

On Christmas Day there was a fireworks display in the square of each town. We sat watching from the terrace of the house as the towns tried to outdo each other. Little universes of light blossomed in the great space, throwing shadows across the countryside, illuminating the patterns of roads, houses, and backyards overhead.

"How was the term?" Fred asked as the display came to an end with a sparkle of yellow.

"Joe got all A's," Ro said.

"Very good!"

I shrugged. "So did she." I had never been praised much for success. Fred's genuine delight upset me. I felt a bit guilty about not going back next term.

The conversation drifted around to the Mercury crisis.

"They know they have to give them what they need, eventually," Fred said, massaging his forehead. "Dragging out the final agreement like this will only give the bad feelings a longer life."

Rosalie looked at me. "You are coming to the rally with me on New Year's Day, aren't you?"

"If they haven't signed the agreement by then," I said.

Fred chuckled. "Show more interest, son. My daughter is a toughie on stuff like this." His voice vibrated with his pride in her.

"Doesn't feel like they'll settle it," Ro said.

I stood up. "We'd better hurry if we're going to make the boat ride."

"Have a nice time," Fred said with a note of loneliness in his voice.

The craft crossed the lake, gliding toward the outflowing stream. Rings of moonlight trembled on the dark water. We sat on deck and watched quietly for a long time.

The boat entered the flow of the river. It would take all evening to circle the equator and return us to the lake by the inflow stream.

A couple passed by us.

"Have you told your parents?" Rosalie asked, holding my hand.

"Not yet."

"Has Bernie found a job for you yet?"

"He will. I hope to get work with him, at least for next term."

"It'll do you good, whatever you decide later."

A slight breeze blew across the water. I watched the lights on the shore and imagined the massive circulating pumps that helped take the water in and out of the lake. Bernie had told me about it on my regular visits to him during his recovery. The water had been manufactured out of hydrogen and oxygen; it would have been very difficult to lug that much water out here when the place was built.

Rosalie slipped over to my recliner, and we kissed for a while. It seemed that she was trying to tell me much more than that she loved me. She also needed me, and I felt my caring for and loyalty to her grow into a force of tenderness that could never be defeated. Kisses are sometimes whispers that you can't quite hear.

"Merk! Merk! Merk!" the crowd chanted insistently.

Riverbend's main square was jammed with people on the afternoon of New Year's Day.

Even though the rest of the solar system had sided with Mercury, and despite the fact that no one would

gain by a breakdown of metal delivery into Earthspace, there was still no agreement.

I was pretty angry when I learned that the ores weren't even half the story. No one would gain—in the long run; but an embargo on space imports to Earth—a cut-off of medical products, alloys, electronics, optical surfaces, not to mention reductions in simple power transmission—would help rearrange, if not topple, many political careers, and ruin a number of business interests on the planet. So it was to the benefit of various rival groups on Earth to drag out the agreement with Mercury and ruin their enemies. Resignations had been in the news all week.

Ro and I were at the edge of the crowd. We'd gotten up late, but it was just as well; we'd have been trapped in the crowdlock, unable to move until it broke.

Making sense of the forces playing around the Mercury problem was a job in itself—a lot of it seemed as if it couldn't possibly make sense—but I tried. Short term interests were delaying worthy long-term developments everywhere. The Asteroids were keeping more of what they produced and building habitats for a growing population; self-sufficiency was an old story for much of Sunspace. The trouble with Mercury was that its population specialized in mining the planet, not settling it; too little time and energy was left over for improving the quality of life. If conditions did not improve, the miners might demand to leave and find work on Mars and in the Asteroids; those growing communities would be happy to have them. So the only way to keep the Mercury families put was to give them a habitat.

Mercury's resources would last for centuries, Bernie had pointed out when we had visited him during his recovery; so it made sense to develop the place. A habitat would stimulate free trade. Mercury's space would become a more humane place to live and work.

Earthside politicians had always hated the planet's increasing dependence on the civilization beyond the sky. But it wasn't Earth's fault that it lacked the conditions for a humane industrialism. Its renunciation of destructive industries had saved the planet's environment, and was a natural development for humankind—a move from a finite industrial base to a practically unlimited one.

"But the principal product of Earth is still people," Bernie had insisted during our long talks in the hospital. "It can nurture, educate, and supply them wherever they may be needed. Someday Sunspace will all be one, and Earth will be the name given to all the inhabited space around the Sun."

Bernie had looked very good by the end of his hospital stay. He stood up straighter when they let him out of bed; his skin looked younger, his hair thicker. His eyes seemed more penetrating and critical; his speech was quicker. It was heartening to see. I was happy for him, and it pleased Rosalie to see us become good friends.

The crowd quieted as the holo projector cast a giant figure in front of the courthouse. The man gazed down at the crowd, as if preparing to stomp us with his feet.

The crowd boomed. "That's LeCarrier," Ro shouted to me, "the chief negotiator!"

The titanic ghost raised its arms. "We have a settlement!" his voice boomed.

"About time!" a smaller voice replied.

"Booooo!"

LeCarrier looked exasperated. "We have a settlement," he repeated as the crowd calmed down. "And some other good news. An asteroid hollow has been diverted from its Martian orbit into a powered sunward trajectory. It should be in Mercury's space within a few months."

The gathering gave a feeble cheer.

"We are taking applications for volunteers who will be needed during the construction of the asteroid interior. No conscript or convict labor will be used, not even youthful offenders."

The crowd cheered more loudly. A sense of relief and satisfaction rushed through me. Rosalie put her arm around my waist. "Finally, it's over," she said.

"We've won!" someone shouted, sending a jolt through me and the crowd. "Merk! Merk! Merk!" the massed voices chanted, breaking up into whistles, cheers, and hoots. "We've won!"

LeCarrier looked even more exasperated, but he smiled. I had the feeling that he did not like the outcome; it had made clear, perhaps too strongly, that power was shifting from Earth to its offspring.

The figure of LeCarrier winked out and was replaced by another—a middle-sized man with black hair, combed straight back, sitting in a bare room. He didn't seem old, only tired.

"Robert Svoboda," Ro whispered, "the head man on Mercury."

Again I felt a thrill, knowing that I was looking at someone very special.

"I'd like to thank the additional negotiators on Earth," he said softly, then paused and looked around, as if listening for something. For a moment it seemed that he was examining the hollow of Bernal. His image trembled. "A minor quake," he said finally. It seemed that he wanted to say more, but he only smiled, waved, and faded away.

"I hope nothing more happens before the agreement is fulfilled," Ro said, holding me close. "A lot can happen before then."

I looked at her carefully and realized what she was thinking. "You want to go, don't you?" I asked.

She nodded. "Don't you? You will come if I go, won't you?" She sounded unsure.

I hesitated, even though I knew I would want to go. "Sure, if they take us." My voice trembled a bit. It would be a big step, and dangerous, unlike anything I'd ever known to sail against the solar wind to the first planet, which whipped around the blinding center of all Sunspace.

"They'll take us," Ro said finally.

"I got this notice from the University," Dad said, "that you're taking the term off."

"I need some time." One, two, three.

"You've only been two terms! What's wrong?"

"Nothing. I need time to think."

"But tell me why," he said after the pause.

I felt my pulse race. What could I tell him? That maybe I didn't want to go back ever? "I'll probably go back next term."

Dad sighed after a moment. "Your mother will blame me."

"You had nothing to do with it."

"She blames me for everything I can't control."

"You're wrong," I said. "She blames you for trying to control everything, to keep things steady and calm, to suit yourself. You still don't understand, do you? This is my decision to make. Mom probably felt the same way when she decided to break away. You've got to understand that."

"What will you do?" he asked finally, and it seemed that my point had sunk in.

"I think I have a job for the term."

"Doing what?"

"Maintenance apprentice."

"Apprentice? Doesn't that require a longer commitment?"

"If I want it."

He was shaking his head, making me very nervous. "Joe, Joe, this is not for you."

"Why not?" I demanded.

He stared. My words caught up with him and he still stared. "What are you saying? You just said for the term."

"Probably." I should have kept my mouth shut. "I'll just have to wait and see."

He was silent.

"Dad, it'll be okay," I insisted, "believe me."

Mom called a few minutes later.

"Joe, are you really going to do this?"

"I'll be fine, don't worry." There was no way they could stop me.

She took a deep breath. "When did you think of this?"

"I need the time off, Mom." One, two, three.

"You'll just lose time."

"It's not wasting time to consider what I want."

My words seemed to crawl across space.

"You could do that while finishing school."

"Come on, Mom, saying it won't make it work."

She glared at me. "I'll call back after your father and I discuss what to do."

I got angry. "You can't scare me, Mom. I didn't say anything when you two separated. That was your own business. Why can't you leave me alone?" I felt terrible saying it, as if I were a criminal.

They'll get used to the idea, I thought as she faded away.

The phone rang again.

"Joe—why don't you just come home?" Dad said as he faded in. "You won't have to work. You'll rest up and we can talk, and we ... you could visit your mother." And report back to you, I said to myself silently. "Well?"

"But I want to work, Dad." One, two, three.

"You don't have to."

"And I want to stay here."

"Is it someone—a girl?" he asked after the pause.

"That's only part of it."

He stared. "Oh—Eva thought you didn't want to come home because we weren't together."

"It wouldn't make any difference."

He seemed relieved. "Did you get the money we put in your account for Christmas?"

"Sure did. Thanks. By the way, I got A's."

"Great! Eva thought it might have been your studies."

"She could have asked." One, two, three.

"We're not ourselves, Joe. It's hard to start life again, alone."

"I guess."

There was a knock on my door.

"Call you next week, Dad. I've got to go." I hung up and turned around. "Come in!"

The door slid open, and Bernie came in. He sat down on my bed and wiped his forehead with his sleeve. "I've been running all day and doing zero. You've got the job, by the way."

"What's the matter?" I asked, sitting back in my chair.

"Building Trades Guild complains I haven't been training enough apprentices."

"You've been sick!"

"I could work full time again. Passed my new physical, so they can't do a thing."

"Then what's wrong?"

He looked at me with lips pressed together. "Their trying to retire me hurts," he piped, "even if the attempt failed. Can't slow down or be sick without someone fishing for your job."

"Don't you work directly for Bernal?"

"I work for the Town Councils. They trust my word, even though Artificial Intelligence Brain's monitors say the same. But the Guild claims any inspector can do as well, that all I do is agree with the sensors."

Who do they think installed those mites in the first place, or replaced most of them at least once? I know every link and cable, and I have a way of talking to the AI Brain so it tells me things without knowing."

It was never work for Bernie, I realized. He was afraid that one day something stupid would be decided and he would lose a way of life; for him it would be the same as dying.

He gestured over his shoulder with his thumb and seemed to breathe easier. "I look out from my house mornings and feel good that the whole inside is green and living, that the towns have electric and water. We built this world out here in the middle of nothing at all. It catches the Sun, gives people a place to live and poke at the universe from."

There was a renewed hope and joy in what he said, pointing to a whole universe outside my problems. It was obvious that he was completely recovered.

"Will I be working for you, Bernie?"

"If nothing goes wrong." He gazed at me with his youthful blue eyes, then scratched his white curls. "Go down to the town hall and register as soon as you can. Are you over sixteen?"

"I'm seventeen." He put out his hand. I reached over and shook it. "You're not an apprentice, though, not unless you sign a contract."

"I know."

"It'll be nice to work with you, Joe."

I smiled. "Same here, Bernie."

I felt bad not telling him it would only be till Ro and I left for Mercury.

[Go to Table of Contents](#) |

12

Working

All during January I watched Bernie work, helping him as I learned. We crawled into every nook and cranny of the colony—under the housing complexes, under the open land, checking the ecosystems, electrical conduits, neutrino-sensor links, water and ventilation passages. It brought home to me how necessary the service level was to Bernal's survival and well-being. The same was true of any building ever built, so there was nothing special about Bernal except the details.

But what details! There was an average of five feet of soil, more than enough for rose gardens and trees; then twenty feet of service level, followed by fifty of outer shell, mostly tons of slag shielding and water-filled cavities as a guard against meteor penetration and hard solar radiation. The slag was left over from Lunar mining processes, hurled into L-5 space by the Moon's mass thrower—a big bucket on a fast track. There would always be enough materials for as many habitats and manufacturing centers as the Sunspacers cared to build.

Bernie not only liked to check when something was wrong—when the Brain picked up a sensor alarm—but he also liked to just nose around. He carried thousands of possible trouble spots in his head, and some part of him was always thinking about what might go wrong.

Of course, he wasn't the only one who knew a lot about the place, but many of the others were no longer on Bernal. Bernie didn't want to live anywhere else; the whole place was alive in his mind.

"You don't have to, Joe," he said to me one day. We were on our knees, staring down into one of the water cavities. A sensor had died, denying us readings of heat changes in the outer shell, as the big ball turned in and out of direct sunlight. Bernal's rotation averaged out the temperature in the outer shell, but the heat exchanges weren't perfect.

"The water may be frozen near the bottom," Bernie said. "One damaged sensor isn't crucial, but it can probably be repaired rather than replaced."

"I'll get it."

He gave a tug on the sensor's line. "It's stuck about twenty feet down."

I put on the mask, adjusted the rebreather pack on my back, and jumped in.

The water was cool, but it got colder as I pulled myself lower. The light beam from my mask played on the cable. The water was gray-blue, foggy.

I pulled lower, shivering as I imagined that I would reach Bernal's outer shell and look out into space, where Earth and Moon swam in a black sea. It was strange to realize that I was swimming toward the stars.

A milky surface lay below me. I reached the floor of ice and saw where the floating sensor had been caught by the freeze. Taking out a small pick, I chipped away until the small device came loose. Bernie whisked the unit away when I tugged on the line.

I cast my beam in a circle, looking to see what else might need tending, then pushed off from the bottom. I was beginning to get cold by the time I surfaced.

"Not much to fix," Bernie said. "Just a plug-in, and we can drop it back on a shorter line." He was rummaging around in his tool bag for the replacement part as I climbed out. "Good going, Joe. Anything else?"

"No," I said as my teeth began to chatter. But it felt good to do something and see the use of it right away—no waiting for distant moments of achievement that might never come, as Morey would have to do. I still felt a bit guilty about Morey. You have no faith in yourself, he would probably say. But working with Bernie made me feel good about myself, and I needed that.

Several times a month Bernie sat before his terminal and punched what he knew—observations, drawings, suspicions—into Bernal's Brain. He loved the colony and was trying to put his whole mind into the central banks of the cyber-intelligence. He was part of the settlement, as much as the recyclers and solar power plants.

The administrators had long ago learned to let Bernie do all the checking he wanted. He often seemed a pest to the younger bureaucrats, but was too frequently right to be ignored. Bernie was a natural resource, a maker of traditions; and if the cyber-intelligences ever became the equals or superiors of the human mind in creative capacity, it would be because they had been weaned and raised by people like Bernie.

I rented a room in Bernie's house. There were fifty such modular houses in the North Low-G Park, mostly single-floor blocks in an open, grassy area with scattered trees. Bernie owned his house, but many of the other tenants were skilled transients, working at specialized short-term jobs in the space factories

near Bernal. Some were planning to go on to the Moon, Mars, the Asteroids—wherever they got the best offers. Most were from Earth, having come out under one kind of contract or other. There were married couples, brothers and sisters, teams of siblings and parents, as well as bands of men and women brought together only by skills—all hoping to make it in off-planet industries. Very few would climb high in the companies and agencies for which they worked, but the pay and benefits were good, the opportunities for education excellent. The work was often dangerous, but there was more of it than could ever be done by the number of applicants.

I thought little about going back to school. I had a lot of respect and affection for Bernie, and he said I was good at what I did. The tiredness at the end of each workday freed me from the pressure of worrying about the future. I felt like someone else; my name was just a tag from the past, like my shirt or shoe color. What is it that makes you what you are? Maybe we have to be forced to learn what we're good at, and that marks us for life, not what *wethink* we are or should be.

I had little time for reading, except as part of the job. I would go over to Cole Hall and have dinner with Rosalie. Between seeing her and the job, I had no time for anything, not even for worrying if I had been crazy to sign up for Merk. It sometimes occurred to me that I was happy here. So why was I going? Because I still thought I was special and could make a difference. Old ideas die hard.

Bernie came home one Saturday afternoon in March and sat down in the old chair facing the sofa, where I was taking a nap. I usually lounged around on my day off, watching newscasts from Earth, waiting for Ro to give me a call when she was done with schoolwork.

Bernie stared at me strangely, and I wondered if what he had to say would make it harder for me to tell him my news.

I sat up. "What is it? You took as if you'd been chased by the Brain's ghost on the engineering level."

He smiled feebly. "It's not that. They're sending me to Merk, to work on the habitat."

"Oh." For a moment I had thought it was something really bad. "Don't you want to go?"

"I should. They need people who can do things well."

"Then what's wrong?"

He shook his head. "It's bad out there. The way it's been is Earth gets various ores while getting rid of undesirables. But there are children and young people out there now who will have it even harder if the habitat isn't built well."

I could see he was being pulled two ways. He liked being needed for a worthy project, but he didn't want to leave home. Maybe the hospital stay had taken something out of him. For the first time since I had met him, I felt a moment of disappointment.

"I should go," he repeated, "even if the working conditions aren't perfect." He looked at me, and I felt that I had missed the point. But then it all dawned on me, and I knew that I would surprise him.

He took a deep breath. "I was hoping ... that you'd apprentice with me and we'd go together. I would need you."

We stared at each other.

"A lot of kids your age are going," he said before I could tell him. He looked down at the carpet.

"Bernie—Ro and I have volunteered."

He looked up and smiled, and I saw how much he had become attached to me. "But don't you plan to go back to school?" He had thought that I would refuse.

I shrugged. "Not just yet."

"But will you apprentice with me? No one wants to sign if it means going to Mercury."

"What else is going on? Tell me."

"Well, the agreement calls for a certain number of workers to be sent, and there just aren't that many volunteers who qualify, not yet anyway. They just about said I would have to go, if only to be able to come back and keep my position here."

"They threatened you?"

He nodded. "Why should I protest? It's a good cause. Bernal can get along without me now."

"Bernie!"

"I know, I know. Earth Authority has people here, pressuring the Guilds. I get an apprentice and go, or I don't work again."

"It's wrong," I said, appalled. "How can they?"

"They'll force my retirement—even if they have to invent a charge. It would be a lot of trouble for me to fight, even if it didn't stick. There's a lot of push to get this job done, Joe. The pressure's on from the top down to raise the skilled work force. Earth has to have the resources, and it's gotten tired of the guilt publicity."

"And you still want to go?" I was ready to go punch someone.

"What Earth Authority thinks doesn't matter. I should go, and I should take an apprentice with me. There aren't enough people. The work will be useful and challenging."

"You'll have me with you," I said, feeling angry that this wonderful man was being pushed around to do what he would have agreed to anyway.

Ro and I were finishing dinner on the terrace of Cole Hall. The dinner hour was over, so we were alone.

"I knew he would probably go," she said after I had told her about Bernie. "They'll need thousands of people before it's over, and they don't have enough to even start. The pay they're offering doesn't compare with other things, so they're using pressure to get people, wherever they can."

"It's going to be a big step for the two of us. I wonder what we're getting into."

"I'm hoping we won't have to leave before the term ends," Ro said. "I don't like incompletes."

She stared at me from across the small table, and I wondered if I was going because of her, or Bernie, or to get away from school. Or maybe I just wanted to see far places and do something worth doing; maybe this was what I'd been waiting for all along, without knowing it. Maybe Earth Authority was right—the job had to be done, and the fact that it would inconvenience individuals just wasn't as important; that's what happens when you wait too long in solving problems.

"I'm glad we're going together," Ro said, touching my hand. "I was sure you'd go. You wouldn't have been the person I know if you had refused. I know we can't be one hundred percent sure about doing this—no one could be. But I know it's right and we're doing the best we know can be done. What else can anyone do?"

She was right. I pushed my doubts aside. The project sang to me; it would be both exciting and useful.

I was sure enough.

"But why should *you* go?" Dad asked.

The question made me angry. "Maybe some of us should accept responsibility for conditions created by those who came before us—especially when we can change things." One, two, three.

"What?"

I thought he was going to laugh.

"Joe—you and I had *nothing* to do with this!"

I felt foolish, but I tried to answer him. "Don't you see? Mercury has been one of the prices of having a Sunspace civilization. It didn't have to be that way, but that's what happened. We'll have a worse future to be responsible for if we don't act." I waited.

He grew pale. "That's a lot of propaganda. It'll get done without you, Joe. You don't have to be a hero."

"I want to go," I said sternly.

"Do you really?" he said after the delay.

"Look around you," I shouted, "at all the metal products. The alloy in your tieclip probably started in a furnace on Mercury."

"Oh, I see," he replied, ignoring my point, "maybe your friends are going. Girlfriend?"

"I have to go, Dad," I insisted, clenching my teeth.

"Think for yourself. You don't have to do what they do."

"I'm signing tomorrow. Look, Dad, I wasn't sure about going back to school just yet anyway. It's a good cause, and I'll learn a lot."

A reasonable tone didn't work on him either. My words caught up with him, souring his expression further.

"It's my decision anyway," I added, "even if it's wrong." One, two, three.

"Eva will blame me," he said sadly. "Don't expect me to call and tell her."

"Are you worried about me or yourself?" One, two, three.

"That's not fair, Joe."

"There was no answer when I called her."

He was very nervous now. "It may take longer than they say."

"Take it easy, Dad, I'll be fine."

"They're only delivering bodies," he muttered, "to fulfill the agreement."

"But it still has to be done," I insisted. "People are dying out there, and I want to do something about it!"

"What can you do?" he asked after the pause.

"I've learned a few things working." One, two, three.

He gave me a hurt, hopeless look. "You don't need my permission," he said finally, "so why talk to me about it?"

I took a deep breath. "Okay—but you can wish me luck. I'm going for personal reasons and because I want to, because it has to be done. I can't imagine not going. Can you understand that? There are just too many good reasons. I wouldn't be the person I thought I was—a person who can make a difference—if I stayed."

He sighed heavily and nodded. "Get ahold of your mother. And keep in touch."

There was a defeated look in his eyes as he faded away.

At the Riverbend Courthouse I learned that I had to contract for a year plus travel time and unforeseen delays. I would not be able to quit.

A bored-looking judge took my handprint. The contract was with Earth Authority, which now governed all employment connected with the Mercury agreement. My contract carried a fine of a hundred thousand New Energy Dollars. Acceptable reasons for breaking it were all listed, the judge said, and there were no others. They came down to two things—illness or death.

"Could you pay the fine?" she asked coldly.

"No."

"Since you cite work experience with Mr. Kristol, I'm assigning you to him. You must accept."

"That's fine with me."

She gave me a stern look. "Name of anyone who could take your place in case of legitimate cancellation?"

I shook my head. "Don't know anyone who'd want to."

She thumbed her console. My ID card jumped out at me. "Memorize the numbers."

As I left the chamber, I imagined the judge checking off another name on her quota list. Five thousand workers. Get them any way that's legal. Press gangs in the year 2057, or the nearest thing, Dad would have said, exaggerating. But it didn't matter, I told myself. It couldn't.

Rosalie met me outside. "You look glum," she said, taking my arm as we walked toward the bridge. Our four shadows seemed crowded on the pavement. "Think of what we'll see, things we might never get a chance to know otherwise. A year isn't anything."

I felt a bit trapped, but I smiled. "Let's go make love in zero-g."

13

Across the Dark

The Mercury transports weren't ready to go until the spring term ended, which gave Rosalie a chance to finish but meant more delay for the miners; fortunately, there had been no life-threatening quakes during the wait.

A group of us, mostly student volunteers, gathered at the North Polar Dock on the first Sunday in April. Bernie wanted me to travel with the students, even though officially I was with him and entitled to share more private quarters. We took only small toilet kits; everything else would be provided on the job, they said.

I hung in the zero-g waiting area, looking around to see if I knew anyone, wondering why Mom had never replied to the letter I had left in her message memory when I had not been able to reach her. Maybe she wasn't checking her mail, or assumed I knew what I wanted and didn't need advice. Her silence bothered me. I felt a bit lost and lonely. It was strange leaving Bernal, after having wanted to come here so much in the first place.

I turned, and Rosalie was at my side. She seemed strange and dreamy, maybe a bit unsure of herself.

"It's too late now," I said as we moved to board the shuttle that would take us out to the big ship. She was silent as we floated in through the hatch and found handholds in the main bay. This was just a big empty area some twenty feet across, where passengers or cargo were put for short hops from dock to ship or between habitats. L-5 factory workers used these to commute from the residential habitats, of which Bernal was the largest.

There was a porthole near my handgrip. I felt a gentle push and watched Bernal move away. It covered the whole view, but then the shuttle turned, and I saw the Mercury ship—five hundred feet of silver teardrop shining in the starry black, growing larger as we crept closer.

The *H. G. Wells*, Number 97 of Earth Authority's Sunspace Fleet, was bigger than most interplanetary transports. Its pulsed fission-to-fusion nuclear engine was an older design, but still capable of pushing the vessel to velocities of well over 150,000 meters per second. That meant that the solar system from Mercury to Jupiter could be crossed in a hundred days. Mercury, Venus, Mars, never took longer than thirty days, depending on where they were in their orbits relative to Earth. Since Merk was still going to be this side of the sun during our travel time, our trip would take about ten days. Paths taken by this kind of ship were nearly straight lines that cut across the gravitational fields of the planets; its capacity for continuous boost put the ship outside the slowing effects of the solar system's usual dynamics.

The teardrop covered the whole sky as we drifted into the forward lock. Air hissed as the hatches opened. Ro and I and the others pulled out, passing into the large vessel.

The *Wells* had twenty-five decks, each facing forward, so that during acceleration there would be from a half to one g for passengers; not real gravity, but a steady boost pushing us down on the decks.

We pulled aft through the core passage.

"University volunteers, deck four," a woman's voice instructed over the com.

I tugged on the rail and coasted into a brightly lit area. The deck itself was ahead of us, looking like a

bulkhead wall with a hundred acceleration couches attached to it. Everyone was talking loudly as they hung on the handrails, which shot across the open space. Some of the faces looked familiar, but there was no one I knew. Most of the blue-green coveralls and boots were stiffly new, I noticed, unlike my own work uniform.

Someone jostled me from behind. "Excuse me," I said, reaching for a bit of the rail. Rosalie was looking a bit uncomfortable for some reason.

"Joe!"

I turned and saw Linda. She was looking at me as if she had never seen me before.

"What is it?" I asked loudly.

She glanced at Ro before answering. "What happened to you? You haven't been in school."

"I needed some time off," I said.

Kik and Jake floated over, looking friendly. I was almost glad to see them.

"So we're all going," Jake said, sounding as if he approved.

Linda was watching me carefully. Kik was smiling.

"Let's settle in," Ro said.

We all pulled over to the deck-wall.

"These two, Joe," Ro said, pointing to the end of the fourth row. I floated over until my back was to the couch and strapped in. Rosalie took the end seat, and we brought them up to a sitting position, but it still seemed that I was sitting with my ass on the wall. The feeling started to disappear as the crowd strapped in and I began to see the surface behind me as a deck; after all, who was I to argue with a hundred people who were clearly sitting on it. When everything is upside down, it all looks normal, unless you're the exception.

"Mind if I sit here?" Jake asked, taking the couch at my left.

"Go ahead," I said, glancing down the row toward Linda. She and Kik had taken the other end seats.

"She wants to sit with her brother for a while," Jake explained. "We'll switch later."

"Fine with me." I glanced at Ro. She didn't seem to care.

"Thanks." Jake seemed a bit somber.

The com crackled. "Fasten up—we'll be boosting in five minutes." The woman's voice sounded deeper.

Rosalie and I joined hands. Jake cleared his throat and shifted in his straps. I thought about the letters I had sent Morey. My going to Mercury would baffle him. I took a deep breath. We were all becoming different people.

I wished that he had answered the letters I had left in his terminal.

"Why didn't they just build better living quarters on Mercury itself?" a girl's voice asked behind me.

"They couldn't be sure," a male voice answered, "not with the way the planet was being torn up. Still is."

"What do you mean?"

"They might have to mine where they build."

The quakes, I thought, mention the damned quakes.

"Well, you know, people want what other people have. They see holos of Bernal, and it looks like paradise."

"If you feel like that, then why are you going?" she asked.

Jake grimaced as I looked over at him.

"The Sun's real big from Merk."

"Keep your hands to yourself. You're making fun of me."

I tuned them out. A deep rumble grew in my guts.

"Here we go," Jake said.

Acceleration began to press me into the couch. The forward bulkhead started to look like a ceiling. The rumble reached a set pitch and stayed there.

I looked at Ro. She smiled. We were on our way to make a world, almost from scratch, for those who didn't have one. It was my dream come true, but from another direction. Sure, there would be plenty of big engineers to run the show, but that wouldn't make it easy. I had learned enough working with Bernie to have some idea of what it would take, and that it would take longer than expected. I had seen too much of what went wrong on Bernal, day to day, to believe that world building and maintenance was all routine.

"You will be able to move around the ship as soon as we reach one g," the woman's voice announced.

The ship was moving across the dark toward the Sun—the open-hearth fusion furnace at the center of our solar system, source of radiant and gravitational energy for the planets, dozens of moons, and countless asteroids.

I saw Sunspace as a vast gravitational maelstrom of matter and light energy ...

"That was probably the captain," Ro said.

"What do you suppose she's like?" I asked.

"Arrogant, proud," Jake answered. "They're above everything, and they love their ships. It's necessary that they think that way, to keep on top of their jobs. You would too if you ran billions of horses of raw energy across the sky."

"But they're not exactly unique," I said. "There's also the national space navies."

"Earth Authority's Fleet people hate the military. Toy ships are not economically productive. Of course, the military does test a lot of new technology, but—"

"I wish there were a screen in here," Ro said.

"What do you want from a refitted cargo ship?" Jake asked. "Notice the smell in here?"

Jake no longer seemed as strange to me as when I had first met him.

"What is it?"

"Probably goats," he replied, "some cows. They shipped breeding stocks in here, for Mars most likely."

A green light blinked on over the hatch in what was now the ceiling, according to my feet, signaling that acceleration was now stable. A spiral stair wound down from the deck above.

"Decks one to six for passengers," the captain said. "Please don't attempt to visit any others."

I looked over and saw Linda talking intently to her brother.

The lounge and recreation deck, two down, was another large drum-shaped chamber, mostly empty except for storage closets around the edge. A few of the kids were already taking out games, readers, and folding tables when Ro and I arrived.

"There's a screen," Ro said, pointing to the large oval plate bolted to the floor between two closets; a long cable snaked out from under it and disappeared into a utility conduit in the wall. We went over and turned it on.

The L-5 sector was a black nest filled with diamonds, emeralds, and rubies. I could see over a hundred objects—factories, research spheres, construction shacks, ship-frame docks, and solar generating plants.

I felt dizzy. The press of steady acceleration gave a sense of weight that seemed different from Bernal's spin force—no coriolis, for one thing—and I imagined that my inner ear had somehow noticed and was adjusting.

Rosalie pulled over two airbags, and we sat down. As the deck filled up with people, I gazed at the screen, wondering when we would return to L-5.

"You okay?" Ro asked.

"It's passing."

I felt a bit cynical as I looked around. Sure, many of the people on board probably cared about what they were going to do, but others were going for the money, to help their work records, or to get away from various personal problems, or because recruiters had talked them into it. I wondered how certain I could be of my own motives.

Yellow-white sunlight flooded the room with an electric glare, giving us all black shadows.

"Turn down that screen!" someone shouted.

Jake approached the screen and cast a winged creature with his hands, making the shadow flap around, but I was suddenly in no mood to enjoy it. This was a bigger step than coming to Bernal. Some of my old doubts seemed to be stirring, and again I felt like a stranger to myself.

Pieces of my face broke free and floated away. I tried desperately to catch them, but there were too many ...

The dream pressed in tightly. I heard a whisper.

"Joe!" It was Rosalie.

I opened my eyes and sat up, listening to the ship's distant growl.

"Go back to sleep," I said.

"Shut up, Sorby," a male voice said behind me.

I lay back and dozed, feeling shut in. I would be locked up with these people for two weeks, and then I would have to work with them on Mercury for at least a year—in the space around Mercury, to be accurate.

I turned my head and saw Rosalie looking at me, and it seemed wondrous that she could know how I felt about anything. I touched her cheek, realizing that I loved her without a doubt, and that I would have come with her even if there had been no other good reason.

I was falling, my stomach told me suddenly.

Then I bumped my head.

People were laughing and talking loudly.

I opened my eyes. The ceiling was only a few inches in front of me. I pushed away and turned to see the whole chamber filled with floaters. Rosalie drifted below me.

I grasped a rail and pulled myself to her.

"They shut the drive down for minor repair," she said.

"Who undid my strap?"

"You were floating when I woke up."

I looked around, trying to catch the prankster's eye.

"Strap in," the captain ordered. "Boost will resume in three minutes."

Ro and I pulled ourselves into our couches and fastened up. I yawned. She smiled at me. We waited.

I felt the soft vibration in my stomach. It seemed slightly different, less of a growl, smoother. Weight crept into my body.

When the green light went on, I unstrapped and stood up, hoping to make the toilet before the line got too long.

"Feel better today?" Ro asked, stretching appealingly.

"I'll be okay."

The toilets were just off the main chamber. I walked over and stood on line behind some ten people.

"How's it going, pal?" Jake asked from behind me.

"Fine," I said.

Jake looked sulky.

"What is it?" I asked.

He shook his head. "This ship is not in the best shape. Even the captain sounds nervous."

"Do you think it's dangerous?"

"Who knows?" he said softly. "Junk heaps have been known to hold together. We'll only know if it doesn't."

My turn came. I went inside and brushed my teeth, then stripped and took a shower while my clothes were cleaned.

"Hey, kid!" Jake called from the next stall. "Imagine we lose our g force now. Hah, hah!"

"Hurry up in there!" someone shouted.

Breakfast was served three decks down. The floor was white. We sat ten-a-table. A large wall screen showed the stars, Earth/Moon, and a small sliver of the Sun. I had eggs, oatmeal, juice, and coffee. Rosalie sat across from me, but we didn't feel much like talking. Not enough privacy.

I thought of Dad as I ate. Old problems, drawing farther away. New problems drive out old ones, whether you've solved them or not; that was the only way it was ever going to be ...

I noticed Linda and Kik. They were not aware of anyone as they talked.

Rosalie and I began to feel more at ease in the group. We didn't care who was listening after a few days. We were all on the ship together, and that was all there was to it. People grow less impressed with each other through familiarity, even if you're very special. Some people will say anything in front of you after a while.

"You'd be good-looking if your ears weren't so big," I heard a girl say, and she was not joking; it was true, I saw, when I looked at the boy.

Dinner on the third day was some kind of beefy stuff with leafy greens in a gooey sauce. It was a shock after the better meals. The cook apologized, promising that if we ate this batch it would not happen again; it sounded like blackmail.

The air smelled of the stuff that night, making it hard to sleep. Most of us woke up looking glum, wondering if this shabbiness was a sign of worse things to come.

We got used to the routine: three meals, sitting around in the rec area staring out into space; exercising in the gym; reading, watching broadcasts from Earth. A few couples managed to steal some privacy in the showers from time to time.

Earth was very proud of itself. From the broadcasts, you could almost feel like thanking it for creating such a bad situation on Merk, just so Earth Authority could do something noble about it.

"What a load of slag!"

I turned and saw a short, stocky guy with white hair and pale complexion—the kid with the big ears—sitting with Kik. Everyone in the rec room looked bored.

"Don't knock slag shielding," said a tall, thin girl with closely cropped red hair. "It keeps you from growing funny critters on your skin when the Sun smiles at you," she added with obvious perversity. I wondered if she meant that Earth had to shield itself from the pain of truth, or was simply babbling.

"Did you ever notice," the white-haired boy continued, "how people care for their health, clothes,

underwear, but not for what's in their heads? Probably the dumbest species in the universe."

"We've still got you," the girl said.

There was some feeble laughter. I wondered what it would be like to see myself from outside. Would I like myself? Would I think that I would ever be anything? Maybe I was the villain in someone else's story? Who was the hero? Maybe there are no heroes or villains, and we're all stuck somewhere between beast and angel.

Things could be dumber and harder than I thought—too hard for the kind of human being I knew. Life was simple and complicated at different times, even at the same time.

What are you anyway? You look into your eyes and imagine the grayness in your skull, and you feel alien. You might easily not have existed, but here you are, gazing out of soft gray matter with watery eyes, examining yourself and the stars, wondering at the darkness, which would be complete if there were no eyes ...

I got up, deciding to visit Bernie on the engineers' deck.

[Go to Table of Contents](#) |

14

Mercury

The *Wells* reached maximum speed, eating up the light minutes toward the center of the solar system. The Sun grew larger on our screens. As we crossed the orbit of Venus, the shrouded planet was a half-disk mirror catching the Sun. Human beings were on Venus also, probing from orbital stations, living in its clouds aboard high-atmospheric islands, exploring the hostile surface. Venus was a place of new dreams, constructive wishes that would one day change the planet into another Earth—if human beings could ever decide where they best liked to live, on planets or in free space habitats. I didn't think they would ever decide, and why should they? Life would always make a niche for itself, as it always had, wherever and whenever possible. Human beings would live inside the Sun if they could.

Mercury was just swinging in front of the Sun, becoming a dark spot as it crept across the solar face. Planetfall was still days away, but I felt a rising sense of expectation as Mercury grew on our screens. There were fewer fights among us, less bickering. We were looking forward to getting there and starting work.

On the day before arrival, one hundred fifty of us crowded into the rec room. Ro and I found ourselves in the middle, sitting on the deck. The chatter grew louder as we waited for the meeting to start. I looked around and saw Bernie standing with some of the engineers near the spiral stair. Something was very wrong, and we were going to be told about it.

"What could it be?" Rosalie whispered.

There was a sudden lull. A small, thin woman in a white uniform was making her way to the screen. Her hair was gray, short, but her face was youthful, with high cheekbones and a small nose. Captain Maria Vinov seemed to be holding her anger in check.

She turned by the screen, and her gray eyes searched the room. "I don't know quite how to tell you this," she said in a low, slightly hoarse voice, as if she'd just come from a shouting match, "but I will have to leave you off at the mining complex on Mercury's surface. The hollow asteroid has not arrived and is not

expected to arrive in Mercury's space for at least three more weeks, due to delays and course corrections."

"And the construction sphere?" one of the engineers called out.

"Those quarters are with the asteroid. I've been told that the hollow is in the fastest possible powered orbit, but I have no way to check. In any case, I can't stay here just to provide living quarters, because I have to pick up the next load of workers. The housing at the mining sites is adequate for the short time you'll be there. You'll get to see why you're here. But if anyone wants out, you can return with this ship and come back on a later one, assuming you're not breaking your contract. That ticket will come out of your pay, of course, since Earth Authority is picking up one round trip tab per contract. I don't need to remind you that a broken contract will mean an exorbitant fine." She was trying to discourage us, but I could see she didn't like it.

Kik stood up and said, "You clearly don't approve of leaving us on the surface."

"Yeah!" a male voice shouted. "The contracts *said* living quarters off the surface."

Sure, I thought, but they didn't say *when* those quarters would be available.

"I have no choice," Vinov said. "You can file a case for contract violation against Earth Authority, but you'll probably have your quarters before it's settled. Returning with me may cost you more than the fine, even if you win." She looked around the deck, locking eyes with me for an instant, and I saw that she knew what this foul-up could mean. "Anyone coming back?"

We're stuck, I thought in the silence.

"One of the engineers, Mr. Denny Studdy, will give you a brief orientation." She nodded to us and made her way out, leaving us uneasy. The truth was being fed to us in small doses, I realized.

A short, slightly overweight man stepped in front of the dark screen and gave us a strained smile.

"I expect we'll manage," he said in a booming voice. "A few basics, so you'll picture the place and it won't all be news to you. Mercury rotates in about fifty-nine Earth days. The mining complex is on the equator. As the planet reaches its closest point to the Sun, the Sun comes up over the horizon and stays there for two Earth days, then sets again. It pops up again a few days later, by Earth clocks, and moves high into the sky. Mercury is now moving toward its farthest point from the Sun again, so the Sun seems to shrink and move faster in the sky."

I had the feeling that he was trying to distract us from the real problems ahead.

"Forty-four days later along the orbit, the Sun is directly overhead. Then all this repeats itself, but backward." Someone sighed heavily behind me. "The Sun grows larger, drops down toward the west, slowing, sets, rises, and sets again. A Merk day is eighty-eight Earth days, and so is the night, almost. Its day is the same length as its year." Studdy was getting it across. Dull but accurate. I listened more closely. "It's the shape of Mercury's orbit, a flattened circle, that keeps the planet from complete tide lock with Sol, where one side would be light, the other dark. Tidal friction brakes by a factor of four, depending on where the planet is in its orbit, close in traveling fast or far out and moving slower. So it keeps one hemisphere facing the Sun when close in, but continues to rotate when far out, and the gravitational bonds grow more elastic, getting more and more out of lock with the Sun. Afternoons can reach over two hundred degrees Celsius, and it can drop to minus a hundred and thirty at night. What all this means is that miners go out on the surface and work like hell for most of the night, but when the Sun rises all labor is confined to below-surface operations. Staying out, even in a suit or protective vehicle,

would be the same as sunbathing in the light of billions of hydrogen-bomb explosions." He paused. "But they need the Sun to fill the solar-power collectors, to run the digging, smelting, and refining robots. There's more power than they could ever use, in fact. The various refined metals are cut into huge blocks and launched on the mass driver toward Earth Orbit. Some of you may have seen similar catapults on the Moon."

"What about the quakes!" someone shouted.

"Mercury's surface is still elastic, and the core is still shrinking. Temperature changes between night and day help trigger quakes. It can't be helped. Don't look at me that way—I'll be there too."

Linda stood up. "What about the underground quarters?"

"They're safe enough most of the time," Studdy answered. "People have been hurt or killed, but most survive. The quakes vary in intensity, and many structures are in poor repair. These people have little time to improve their dwellings, or repair them. They also have to maintain the industrial equipment, much of which is old and obsolete. And there's less power at night, when the solar collectors can't work. Industry, not housing development, gets the energy."

"But you said there's more than enough power," the boy with the white hair said. "Why aren't there power satellites beaming it in all the time?"

"That's one of the things the orbital habitat will make possible. High-orbit beamers require maintenance and relays. The present satellite collectors are low orbit and inefficient by today's standards."

"There's no reason a subsurface living complex couldn't be made safe," Linda said.

Studdy shrugged. "Maybe—but they've seen what free space habitats are, and that's what the agreement says they'll get."

"You mean they put a gun to Earth's head," someone said bitterly. I turned too late to see who it was, but later I learned that six people were going back with the *Wells*.

"Look, it's just as well. We'll have metals, and if Merk is torn up completely for resources one day, as is likely, we won't have to worry about evicting anyone. There are lots of reasons human beings shouldn't live there."

"What about the solar research base?" Jake asked.

"It's well away from the mining sites, and from what I know they've never complained about their conditions. But the teams there are replaced fairly often."

I stood up. The matter-of-fact coldness of Studdy's presentation was beginning to rub me the wrong way. "You don't show much sympathy for these people, Mr. Studdy," I said, and stood there in the sudden silence, waiting for an answer.

"Listen, kid," Studdy said after a moment, "I volunteered same as you—" He stopped short. "Sorry—you're right—I have been cut-and-dried about it. We need to be reminded why we're here. What have you to say?"

I cleared my throat. "Only that we should think about how we're going to get along with these people. We shouldn't come on as their saviors. We're here to give them what should have been theirs a long time ago. Fast ships and robotic industrial equipment made it economical to mine Mercury, so it should have been economical to give these people a better life by now."

"You're right—we might get off on the wrong foot if we don't think why we're here. We have to get along with the miners. What's your name?"

"Joe Sorby."

"Thanks, Joe. But remember, there's something in it for us also—skills, experience, good pay."

Someone snickered behind me. I turned and tried to spot the person. "Why did you bother to come?" I asked loudly, and sat down.

Rosalie squeezed my hand. I felt a bit foolish, even though I knew I was right.

Mercury seemed to be waiting for us as we crossed its path and decelerated into a wide ellipse around the cratered ball. Captain Vinov then dropped us into a tight orbit, only a hundred miles above the surface, so the landing shuttles could use the whole planet as a shield against solar radiation when they ferried us down. The small craft were not as well insulated as the big ship, which carried lots of water in its triple hull, and they were especially vulnerable to solar flares—those bursts of radiation from the Sun's surface that could cook unprotected human flesh in seconds.

We went down in groups of twenty-five. Everyone seemed a bit glum, knowing that things were going to be very different from what we had expected. I didn't feel like a world builder at all. No one talked about the possible danger, but it was there, an undercurrent of fear in our minds.

Bernie, Ro, and I strapped in.

A fifty-foot tube of gray metal with a control cabin at one end, a cargo bay fitted with couches for passengers, the shuttle frightened me with its smallness, thin walls, and shaky-looking bulkheads; it had seen too many years of service and couldn't be safe.

Being next to a porthole didn't make me feel any better; it was probably the weakest part of the vessel.

But the view was breathtaking as we went down into Mercury's night. The planet was mysterious in starlight. Looking carefully, I saw a faint string of diamonds leaving the surface: slugs of metal boosting toward Earth Orbit, to arrive many months later in a nearly endless train. The shuttle turned a bit, and I saw where the slugs were high enough to catch the sunlight, bursting into prominence one by one, like stars being born ...

What am I doing here? I wondered as the descent engine fired below me. I lay pinned to my couch, overcome by doubt and the sudden sense of distance from home, from my parents, from my lost friend Morey, and all the things I had known as a boy. I was here to help, but would it help me? Did anyone care? Would anyone remember? I reached out to the cold stars and felt saddened by their silence as the shuttle touched down.

"What's that?" Ro asked.

"What?" I unstrapped and sat up. Everyone in the small hold was silent. The shuttle trembled, shuddered, and was still.

"We're just settling," I said.

"A quake maybe," Ro added.

"A small one," Bernie piped. "Probably happens all the time."

"And so do the big ones." I turned and saw it was Whitey with the big ears.

There was a metallic thud against the side of the craft.

"Loading tube," Bernie said.

We lined up in front of the airlock.

"How you feeling, Joe?" Bernie asked, smiling.

"Okay, I guess," I answered. But suddenly I was overcome with feeling for him, and I was glad that he was here to share what he knew with us and with the miners. It made me feel safer.

Rosalie went through the lock. I followed. The tube dropped at a thirty-degree angle, leading directly underground. We emerged into a large, ceramic-sealed chamber with rounded corners. Tunnels led off in four directions. The chamber filled quickly.

"Your attention!" a male voice announced with some strain.

I turned and saw a middle-sized man with black hair, combed back in the way I remembered from when I first saw him on the holo in Riverbend's square.

"I'm Robert Svoboda," he said more softly, examining us with dark-blue eyes. "Please follow me single file." He seemed a bit nervous and impatient. "There will have to be four of you to a room in many cases. We didn't expect to have to house you. Try to allow for our simpler conditions."

He turned and led the way out through the tunnel behind him. I felt a trembling in my boots. Svoboda stopped and turned his head slightly, as if something invisible were following him. Then his bearlike shape marched forward again.

I looked at the bare bulbs and heat-sealed walls as we followed him through the passage. We went through a half dozen round connecting areas. Locks slammed behind us, echoing ominously. The tunnels were always rough-hewn, sealed with heat, stained with humidity and mineral discoloration. We came to a row of doorways.

"These crank open by hand," Svoboda said. "Seven rooms. One rule. Keep your doors sealed when you're inside. A quake can cause a loss of pressure in the tunnels, but you'll still have air in the rooms."

"You'll share with us, Bernie," Ro said.

"Okay by me."

I cranked open the first door and stepped into darkness.

"Light's overhead!" Svoboda shouted as the other doors were opened. I reached up and pulled a cord. A bulb went on over the door, throwing my shadow across a stony floor. I held on to the cord, shocked at the room's simplicity.

There were three bunks; a sink-toilet-shower combination was partly concealed by a plastic curtain. Everything was clean, but much used. No sheets or blankets on the bunks, only sleeping bags.

"Well," Rosalie said, "it'll only be for a couple of weeks." She smiled at me, but I didn't react.

"I've seen worse," Bernie said.

I had never seen anything as bad. "The designs are so old. Look at that bulb—you can see the filament glowing."

"We'll get by," Ro said decisively.

Our shadows looked as if they had been painted on the floor. I felt another vibration in my boots. The bulb behind us flickered, filling the room with trembling shadows; the ventilator coughed, then resumed its steady whisper.

[|Go to Table of Contents](#) |

15

Furnace in the Sky

The Sun breathed against the surface of Mercury.

Collectors drank only a small portion of the pulsing flow of energy, but it was more than enough to run the planet's industry.

Rivers of metal flowed into molds, cooling during the long nights and sliding onto the automated sleds that hurled the slugs into fast unpowered orbits.

As we watched in the underground control center, slugs rose to become stars above the open-pit mines, a string reaching all the way to Earth Orbit, enough metals to refill the home planet's empty mines a thousand times over.

Any single chunk might take up to two years to reach the factories in Luna's L positions, but the forward slugs in the perpetual train arrived constantly, so it didn't matter; that's why it was so important not to break the steady flow—months, years, might go by before it could be restored. I was here with 199 others of the first wave to make sure that didn't happen, even if it meant helping people in the bargain!

Robert Svoboda had no illusions about the economic and political pressures that had brought us here, even if many of us were sympathetic to his cause; sympathy alone would not have been enough. He had been here from the start. He knew the work that had gone into the solar-power plants, launch-sled tracks, and housing, and what it all cost to keep. His degrees, skills, and experience were adapted to a life here. His son and wife were here. Many of the miners had spent half their lives here, laboring like some Hephaestian horde to feed Earth's needs.

Svoboda's aim was to improve the lives of the ten thousand people on Mercury. To them it seemed that the rest of the solar system was building paradises. There were certainly enough resources to build paradises, so why shouldn't they have one too? They shipped enough metals for a thousand habitats, so they deserved an oasis in the sea of solar radiation, away from the rock, dust, and quakes. They were willing to work here, even raise families—I came to understand why later—if they could feel reasonably safe. One of the first things Svoboda showed us were the sealed tunnels that served as tombs for the miners trapped by the quake of '28.

After only a few days, many of us began to pick up the miners' attitudes. Rosalie and I began to hate the buried hovels. Who cared about the motives of Earth in sending us here! There was going to be something better before we were done.

The real problem of building a large habitat in orbit around Mercury, once the political decision had been made, was not in the basic work. A large slug could have been blown up into an empty shell years ago, if

the miners had diverted the work force and slowed up deliveries to Earth. Even the shielding was pretty routine engineering. The difficulty was in getting the skilled environmentalists to shape the ecology within the shell, the life-support systems that would be reliable and pleasing. It was an art to make an inner surface look like the out of doors. The number of specialists was limited, and they were expensive, even if they could be convinced to come to Mercury for the long time needed to do the job right. I understood the bitterness of the Mercurians, and why Earth Authority was now applying money and personal pressures to gather the talent. Not everyone could be expected to come here because they thought it was the right thing to do; the problem had to be blitzed before it got completely out of hand, whatever the dangers. Nothing else was possible at this late date.

But a rushed approach to the interior work would risk repeating the failure of the first L-5 colony, which had become a barren cylinder of concrete townhouses—cramped, ugly, and inefficient. It was now an industrial warehouse. Only skilled workers could build an easily maintainable and improvable habitat, and these people were not to be had until the Asteroids had come to Mercury's help. By providing the empty husk of the asteroid, and by forcing Earth to make good on an old promise, the Asteroids had confirmed a bond with Mercury. Building up the insides would still require a large force, but not as large as would have been needed to start from scratch. Ro and I belonged to the easily recruited, to those who would be trained on the job, not to the highly paid elite; only my association with Bernie gave me a bit of prestige.

I wondered about myself. Events not of my making had been the occasion for decisions I might never have thought of making. But now that I was seeing the life of Mercury close up, and feeling my own life in danger, I knew that the anger I had felt on Bernal was justified. It was not enough to know and understand; one had to act, especially when given the chance.

Svoboda surprised many of us. He could have left years ago, it seemed to us, and found a better position anywhere in Sunspace, but he was determined to make things better here. He made me feel the same way; after all, I was going to be here only a short time, so how could I do less? I think he noticed these feelings in many of us, despite the politics that had sent us here, and that helped.

There wasn't much to do while we waited for the asteroid. Svoboda gave us a tour of the underground town during the first few days.

There were three underground villages, covering some thirty square miles. Each had a large central meeting chamber, where people gathered to dance, sing, or watch programs from Earth. Solar activity made watching programs difficult at times, despite the relay satellites, even when both planets were on the same side of the Sun. The tunnels ran for hundreds of miles, and more were being cut as space was needed.

"I want you all to be very careful," Svoboda said toward the end of his tour. "If anyone is injured severely, or develops a major disease, we can't put you in suspended animation—we just don't have the equipment to hold life. If we can't treat it, you die."

We were all a bit shocked at this. He might just as well have told us that there weren't any first-aid kits, or that we could die of a simple infection.

"How did your community grow?" I asked. "From what I know it wasn't supposed to be permanent."

He smiled. "People married. Others sent for their loved ones, had kids. There was no plan. Earth Authority administrators ran us on a rotational basis, but in time that was left to us. It was too hard for ambitious career types, who came and left as soon as they could."

"So you run yourselves?"

"Almost, but the strings are still there—long, but we feel them. How could all this happen? I can see the question in your faces. Well, toward the end of the last century people finally understood that to have a humane culture on Earth they would have to go out into space. But they began to take for granted those who went out to run their industry and get their resources for them. Not all problems are material; some are organizational, political, helping injustice exist in the midst of plenty."

"People never learn," I said.

"They do, individually, but societies forget. It was thought that Sunspacers would take care of themselves in everything. Until people live forever, each generation will have to learn things fresh."

"There's tradition, institutions, history," Ro said.

"But reminders are needed." He looked over his shoulder at the big screen, then back at our group. "Can you all find your own way? I have some work to do."

"I think we can," I said.

"Oh—here's my son, Bob. He'll go with you."

Robert Svoboda, Jr., looked like his father—thinner and slightly taller, but with the same black hair and dark blue eyes. He had come to the common area a few times, and I had liked him immediately, though he seemed to worship his father too much.

We followed him out from the control center.

The miners grew very busy as the Sun climbed to its noon position; this was the time of maximum energy reception, use, and storage.

While the great robots ripped ore from the pits, while nuclear charges were set to open still more holes, while people struggled to repair aging equipment in the underground garages, and while the sluices ran rivers of liquid metals into molds, the support army prepared food, cleaned quarters, nursed the injured, kept records, and planned shifts. Children were being raised and educated at the same time. Many were about my age. Many seemed terrified that they would never finish school—that the next quake would stop them. The whole society was at war with time and the Sun, hurrying to mine and smelt as much metal as possible during the three months of light.

I felt guilty eating, sleeping, and waiting nervously while all this work was going on. A few jokes were made about us; some of the people our age were openly hostile; but grudgingly the idea took hold that we were being saved for other work. Mercury's gravity, only about thirty-nine percent of Earth's, made us much stronger, though we had to keep up our muscles with daily exercise and take some care in how we moved around.

People live longer on lower-g worlds like the Moon and Mars. Fighting Earth's gravity wears out your muscles, deforms your stomach and gives you backaches. Your heart lifts tons of blood through endless miles.

Here that strain was reduced by sixty-one percent, and a human being could clear a hundred even without medical help, if the quakes didn't get him first.

"They hope so much," Ro said one day.

We spent a lot of time in the common areas, playing cards and listening to music, or just talking, but it was only a way of waiting. I tried to study some of the required technical material, but the delay and the

constant thought of danger were getting to me.

Bernie tried to stay away from the room, to give Ro and me some privacy, and that was a relief; but both of us were beginning to feel oppressed, closed in. The miners felt this way all the time, I told myself, but it didn't help.

"It won't be much longer," Ro said one afternoon. "The asteroid has been in sight for days now."

I kissed her for a long time.

"Miss zero-g?" she asked softly.

"Sure." I got out of bed and put on my coveralls and boots.

"What is it, Joe?"

"Nothing." I was beginning to lose the sense of being myself again. "We may be here much longer than we expected. It's beginning to sink in, I guess."

"We decided to come," she said firmly.

"If we could just get started—instead of all this waiting." The light flickered as I zipped up my boots.

"It won't be long now."

I looked at her. "It's dangerous here—some of us might never see home again. Did you see how many injured they treat in the hospital?" I had a sudden vision of Ro lying there with every bone in her body broken.

"I've spent time with the patients too," she answered. "Only a few were really bad, and not from quakes—not recently anyway."

"You heard, didn't you?" I insisted. "They can't freeze anyone. If it's a bad injury you don't have a chance. What if it were me? Or you? It's ten days back to Earth, when you can get a ship!"

"I know," she said in a low voice. "I'm afraid, too."

I sat down on the bed, and we held hands, as if afraid to let go. I had the feeling that I was about to fall apart, and the pieces wouldn't recognize each other. Ro was looking at me very carefully as she lay warm and soft in the sleeping bag. We were quiet for what seemed a long time.

"There's always a bit of you I can't see," she said finally. "I know that you love me, you're helpful and caring about people, and you work when you think the job is worth doing. But there is always a part of you that you hold back. Oh, I don't mind, but someday I hope you'll tell me about it."

She was right. There was always a part of me that longed for the clean, cold beauty of the stars. I still wasn't so sure that being a human being was so great. Maybe I wanted more than the universe had to give? That's what Morey and I still had in common—he wanted to be more than a human being, and in my own way I still wanted the same thing, to be able to say that this wasn't all I was, that there could be more, that there had to be more. I had learned one thing already—the miners were in a bad situation, but their response was superhuman. If they could do it, then so could I.

There was a loud knock on the door. I tensed, fearing an emergency of some kind.

"Who is it?" I asked loudly.

"Bob Svoboda," a muffled voice replied.

I went to the door and cranked it open a crack. Bob smiled at me. "I came to invite the three of you to dinner at our place."

"Uh, sure," I said clumsily.

"At eight. My family would very much like to have you. Sorry to disturb you." He smiled and moved away.

"Why us?" Ro asked as I cranked the door shut.

"Who knows. It'll be a change."

"Maybe we were picked at random," she said.

The lights flickered a lot, leaving us in darkness three times as we made our way toward the Svoboda apartment. Finally, we came to a massive door at the end of a long tunnel in the north village.

"Looks like the entrance to a leader's lair," Ro said.

"Watch it." Bernie pointed to a crack in the rock floor. We stepped over the break and stood before the door. The knocker was a chunk of ore on a chain. I struck twice. "Come in, come in," Bob said as the door slid open.

We filed past him into a large living area, onto a large green rug that covered the center of the red tile floor.

"My parents will be out in a minute."

Ro and I sat down in the chairs facing the sofa. Bernie lowered himself into the middle of the sofa and bobbed for a moment before settling. Moving around in low-g took some care until you got used to it, especially when dealing with air-filled furniture.

"Dinner will be a bit late," Bob said. "We all got home late."

The green plastic of the furniture, I noticed, did not match the rug. Cracks marred the ceiling and walls. There were some flat pictures on the end table by my chair—shots of a dark-haired girl of about seven, and an older, dark-haired boy.

"My brother and sister," Bob said. "Alexei and Lizaveta died three years ago in a quake. A wall in the day care caved in. Most of the kids survived. They found one of the babies under Liza. She'd protected him with her body."

I didn't know what to say. Bernie swallowed hard. A sad look came into Ro's eyes.

Bob made a face. "So—when do you think we'll move into the habitat?"

"We'll know better," Bernie said, "when we get the full force working inside the rock shell."

Bob was looking at me. He seemed nervous about the way I was examining the room. "It's all I've heard about since I was a kid."

"You were born here?" Ro asked.

"In the hospital."

"And you've never been away?" I asked.

He shrugged. "Maybe I'll go to college on Luna when the habitat is ready." He gave me a panicky look. "I know that's a bit late, but you're taking time off to work here. As long as I get a chance to learn."

Robert and Eleanor Svoboda came into the room. The Mercurian leader looked straight at me, as if trying to learn more about me.

Eleanor was a tall, thin woman with short, curly brown hair. She looked at us in turn and smiled. She seemed tired, but there was strength in her brown eyes.

"I've wanted to meet as many of your group as possible," Robert Svoboda said, "while you still have time."

There was an awkward silence.

"Thank you for inviting us," Ro said.

We stood up and followed the Svobodas through an arch. As we sat down at the table, Bob appeared in the archway from the kitchen, wheeling in the soup. We took our bowls from the cart as he went around.

"Um—good," Ro said. "Not like any mushroom soup I've tasted."

"There's bean curd in it," Bob said as he sat down between his parents. "I've made it since I was a kid." He rolled his eyes.

I happened to like the mushroom dishes I had tasted on Merk, but then I usually didn't eat them all the time, either. Because it was easy to grow them here in parts of the dark tunnels, mushrooms were plentiful and seemed to turn up in almost everything I ate.

"I'm glad you like it," Mrs. Svoboda said, smiling.

"It's very fine, Mrs. Svoboda," I said, knowing that I wouldn't want to have her angry at me for anything.

"Please," she said, "call us Robert and Eleanor. Now—you're Joe, Rosalie, and Bernard."

"Call me Bernie."

"I hope the delay hasn't been too boring," Robert Svoboda said from the head of the table. "I'm aware that there has been some bad feeling—"

"We're anxious to work," I said.

Bob wheeled out our empty bowls and breezed back with the main course. We took our plates as he went around. I looked at what seemed to be a piece of meat with mushroom gravy, green beans, and a potato. My feet trembled as I took a bite. Robert Svoboda looked up, his face a hard mask.

He stared right through me. I tensed. Then his face softened as quickly as it had gone rigid. He ran his fingers back through his hair and sighed.

We were silent.

"Well?" he asked harshly.

"Is there anything we should do if one comes?" I asked.

"We're on a bad fault, Joe. The big danger is in loss of pressure and cave-in." A distant look came into his eyes. "It didn't seem so bad in the early years, but it got worse."

"And we got used to worse," Eleanor added.

I looked at her and realized that she had seen people die. When she looked at her son, she saw that her future was still being held hostage. I imagined living here with Ro all these years, and it frightened me.

"Things will be better," Eleanor said nervously, trying to sound cheerful. "Bob, the wine."

Bob almost tripped as he went out to the kitchen. On Earth he would not have been able to right himself and catch the chair so quickly; there were some advantages to lower g.

"You're the third group we've had to dinner," Eleanor said, sounding more in control of herself.

"What do you think of us?" Ro asked, and my stomach jumped.

"You're nice people to leave your schooling. I hope you don't lose too much time."

Bob brought back a large green bottle and poured out full glasses for everyone. The white liquid trembled slightly in my goblet. Robert Svoboda was staring intently at his glass. Bob put the bottle on the table and sat down.

Robert Svoboda raised his glass. "I want to thank you personally, even if you have doubts about being here. You're not likely to get any medals from Earth Authority."

We sipped.

"The grapes grow well here," Eleanor said.

Bob saw his chance. "We sure have enough sun!"

We laughed and sipped some more.

"Where are you from, Joe?" Robert Svoboda asked.

"New York City."

He held back a laugh. "Now I know you're not used to our quarters. Must seem like jail cells. How about you, Rosalie, Bernie?"

"I'm from Bernal," Ro said.

"Same here," Bernie added.

"He helped build the place," I said.

Svoboda's eyebrows went up. "Bernal functions admirably. I visited once . . . It seems so long ago now." Eleanor gazed at him with concern.

Bob rolled out tea and coffee after dinner. We took our cups and followed Eleanor out into the living room, where we reclaimed our seats. Bob sat cross-legged on the floor. His parents sat on some shabby black cushions. I wondered how many people had died on Mercury, but was afraid to ask.

Eleanor smiled at me, and I saw how beautiful she was, how even more beautiful she had been.

"What were you studying, Joe?" she asked.

"Physics—I thought."

"You're not sure?"

I sipped my tea. "Maybe later, I don't know."

"Rosalie, what interests you, besides Joe?"

I looked at her. She was blushing.

"There are a number of things I might want to do."

Robert Svoboda's brooding concern filled the room, pressing in around us. These people had almost forgotten how to relax. They might have left a long time ago and found a better life, but there were too many dead for the Svobodas to leave. The Svobodas carried Mercury on their shoulders.

"How many of your people do you think will stay after the habitat is built?" Bernie asked.

Robert looked surprised. "This is their home—a whole generation has grown up here. That may be hard for some people to understand, but it's always been true. People have lived in deserts and on frozen tundra—it's actually easier than that here." A strangeness came into his eyes, as if he were peering through the rock. "There is beauty in living here, in stealing Mercury's insides while the big Sun stands watch. A habitat will take off the rough edges. Then maybe more people will immigrate here, and those here will feel better about staying."

"How big will the habitat be?" Bob asked. I could see that he just couldn't wait.

"The asteroid is maybe twelve kilometers long," Bernie said. "That should take over a hundred thousand people in time."

Hope and wonder danced in Bob's eyes, and right there I knew that it would all be worth it.

"I've always wanted a house," Eleanor said, "with sky and clouds and sunlight coming in through the windows...."

"The old mass driver," Bernie continued, "will be replaced by the gravitational catapult. You'll be able to shove slugs into faster orbits toward Earth. And the string of solar-power satellites will relay energy to Mercury's surface even when the sun is down, so you'll have full industrial capacity all the time."

Svoboda said, "Some of my men suspect they'll only have to work harder."

"I don't think so," Bernie replied.

I heard a high-pitched whine. Svoboda turned his head suddenly. "I'm being called. Excuse me." He stood up and left the room.

Eleanor motioned to her son. "Maybe you'd like to take our guests to the Center?"

"Uh—maybe later," Bob said. I guessed he wanted us to himself for a while. "What's it like on Earth, Joe?"

I told him about open skies, colorful sunsets, ocean waves, winds and rainstorms, tall cities and crowds. "You'll see it yourself one day," I finished, not thinking about what I was saying.

He shook his head. "It would be hard. Remember, I was born here, my muscles grew up here. I'd have to wear walking bones to brace me in the higher gravity. Maybe I could adjust—I've always exercised. I can go to the Moon, Mars, the Asteroids, maybe even Bernal, which isn't a full g anyway, and much lower in places."

I felt sorry for him, as if he were crippled. Lucky for him there were good schools on places besides Earth. On the Moon he'd have to exercise to keep up his Mercury muscles in the one-sixth gravity. I'd never thought too much about it, but it was an important problem.

"That's another reason we need the habitat," Eleanor said, "so we can have the choice of gradually increasing the g-spin at which our children are born, so future generations won't be cut off from Earth. Many of our people are now too old to ever go back."

"That may take a long time," I said.

"It may never happen," Eleanor continued, "if enough of us decide against it. It's how it happened in the first place that's shameful."

"People were promised regular trips back," Bob said. "Some go now, but only because the ships have grown faster. In the old days people traveled back and forth in pods attached to a slug. It took months in zero-g. Not many went."

"The Asteroid settlers," Eleanor continued, "keep their habitats at two thirds Earth gravity, so they can go anywhere, while we can go only to the low-g places in the solar system. That was the point with those serving life sentences, to trap them here, but others were caught and are now too bitter and too weak to go even if they could."

"That's terrible," I said, as the full implications sank in. Earth had done this, but I felt as if I had done it myself. The habitat had to be built as quickly as possible.

Eleanor smiled at my sense of outrage. "It'll be easier on future generations. It's hardest on those who remember Earth."

"It's not so bad," Bob said. "People do live longer in low-g, and they don't have back trouble, without all the medical fix-up you have to go through on Earth."

"Why did people have children," Rosalie asked, "if they knew they'd be trapped?"

Eleanor grimaced. "They said to go ahead—raise families, you'll have your habitat."

"They treated us *all* like convicts," Robert Svoboda said as he came back and sat down next to his wife. "Problems in the control room. The foreman is sick."

"Where are you from, Eleanor?" Ro asked.

"Virginia. I was in my teens when Robert and I left."

Svoboda took her hand. "We'll visit. We can get in shape, you'll see. Our muscles will remember."

Her face was calm, but I felt angry for her.

"Bob," Eleanor said, "the Community Center."

We all stood up. Eleanor was smiling faintly at me. Robert looked as if he had just gotten his second wind, and I knew he was going to visit the control room.

"Thank you for coming," Eleanor said.

"Care to come with me, Bernie?" Svoboda asked.

"Thanks—but I've got to get some sleep."

Bob led us to the door. "I usually go down to the Center dance anyway." He turned the crank.

We stepped out and over the crack. Ro and I held hands as we followed him.

"Have a good time," Bernie said at the first branching, sounding a bit lonely.

"Good night, Bernie!" I called after him as he disappeared into the tunnel at our left.

[Go to Table of Contents](#) |

16

Dancing

Two massive doors stood at the end of the passageway. One was cranked partly open, spilling yellow light into the rocky tunnel. Music mingled with voices and laughter.

The Community Center had always been full of kids when I'd looked in, but Ro and I had been shy about going in uninvited. Most of us kept to the common areas near our quarters. Many of the Merk kids were not as polite as their parents, we had noticed, but I couldn't blame them; Mercury had good reason to dislike Earth, without our making it look as if we had come to take over. The Merk kids *needed* to feel superior to us, at least for a while. It would be easier going in with Bob Svoboda.

The chamber was a fused upside-down bowl, at least seven meters high at the center and sixty meters across. Dancers surrounded the screen platform—at least a hundred couples spinning, rubbing, and jerk-jumping to the percussion. The flat screen, not a 3-D holo, was picking up music and dance from a New York station, delayed by the six minutes or so it took the signal to reach Mercury at light speed, not counting relay time. There was a sharp contrast between the well-dressed New York kids on the screen and the overall drabness of the Mercurians.

I spotted Linda and Jake. Her hair was loose and flying in all directions. He seemed to be doing his best not to become airborne. We had all tried hard not to show off by doing things the Mercurians could not—like jumping high into the air. It would be easy for us to win fights with Merk kids, given our stronger Earth muscles. I had been careful not to use my full strength when moving around. The Merk girls looked at us with some interest, which annoyed their boyfriends.

"Hey!" someone shouted. "Let's see you go up real high!"

The dancers made a circle around Linda and Jake.

"Come on—do it!"

Jake looked around, and jumped.

"You can do better than that!" the same voice shouted.

The crowd hooted. I sensed both hostility and interest in their demand.

Jake motioned for Linda not to do it, but she went up high, turned over, and landed in a group of people, toppling them to the floor.

Everyone laughed. "Don't worry—they'll be here long enough to weaken!"

A boy I didn't know shot up higher, and landed on a couple.

"I've sprained my ankle!" the girl complained, unable to get to her feet. Her boyfriend did not look amused. I caught his eye and he glared at me.

"How's she going to work?" he demanded.

I felt bad.

"They're not so tough," another boy said, giving Jake a shove from behind. Someone cursed. Jake stumbled toward me, and I caught him.

"Calm down!" a voice boomed over the screen's public address system, but it was too late.

A fair fight wouldn't have been possible, despite our Earth muscles; there were only eleven of us in the hall. The crowd booed as the music dropped to a whisper and we were rushed from all sides. People fell to the floor, punching and clawing, tearing at each other's clothes. Ro and I retreated through a sudden hole in the circle. A short, stocky girl grabbed Linda by the hair. Jake was being pummeled on the floor by three boys. The Merks were doing very well, but I was afraid that someone would get seriously hurt.

The crowd pressed in closer, cheering. I saw a familiar New York caster on the screen, speaking very low. His blindness to what was going on below him seemed comic.

A loud whistle shot through my ears as police invaded the hall. It was obvious that they had been watching the situation closely. Six green-uniformed cops penetrated the crowd and began to untie the knot of kids on the floor.

"Okay!" shouted one of the cops. His voice went through his handset and boomed through the screen speakers. "All earthies out of the hall!"

One of the other cops glared at me. Bob smiled, and I saw a bit of his parents in his features.

"It was our fault," I said loudly. "Let's go."

Linda, Kik, Jake and the six others grouped around Ro and me. We turned and led the way out.

"That was really dumb," I whispered to Ro.

"Sure was," she said, looking exasperated.

A cop cranked the door open all the way, and we went out into the tunnel.

I heard a deep growl, as if a beast were creeping toward us from somewhere ahead. We stopped, but nothing appeared. It was invisible, I thought stupidly as the lights flickered.

"What's that?" Kik asked behind me.

I peered ahead in the fluttering light. A cloud of fine dust was creeping toward us across the floor.

"Tremor," I said, taking a few steps forward.

"Joe..." Ro started to say as the floor lifted, throwing me back. We clutched at each other and staggered to one side, hitting the wall with our shoulders.

Old Merk danced for us.

The tunnel floor buckled and split. Ro and I were on all fours, tasting dust.

"Back inside!" I shouted as I raised myself on shaky legs.

A crack opened near the doors and cut down the tunnel like slow black lightning. We jumped to avoid it.

The lights wavered. I saw Kik stumble, fall in slowly between blinks, and disappear. Ro and I were on opposite sides as the crack passed us, veered, and split the wall.

"Kik!" Linda cried, unsteady at the edge.

"Get back!" I shouted, afraid that the fault would widen.

"Kik!" she called. "Kik!"

Jake grabbed her.

"Aaaaaaaaaaaaaa!" she wailed, struggling. It looked as if she would pull Jake in with her.

"Back into the hall!" I shouted again.

Ro and I made our way back, staring at the fault between us. The others were at the door, but Linda still squirmed in Jake's arms.

"Let me go, let me go!"

Jake hauled her back. "He's gone—we've got to get back—try to understand what I'm saying." She broke free and dropped to her knees. Jake tried to pull her back by one arm.

"No! No! I can see him!"

"Help me," Jake said as I reached them. Ro hesitated at the door.

"Get inside," I called to her and grabbed Linda's other arm.

"He's hanging there," she insisted, "I can see him." She was very strong. "I can see him—please look!"

I peered down, and she stopped wriggling. "Can't see a thing," I said, coughing from the dust.

"Don't let go," Jake whispered.

Linda looked up at me. "Joe! Look hard—I can see him, please!"

I strained to see into the gloom. There was a body hanging some five meters below us. "Jake, he's there."

"Looks like a shadow."

"Let me go!" Linda shrieked, twisting her arms. "Let me go!"

"I'll go," Jake said, and let go her hand.

I knelt next to Linda, and we watched him climb down. Linda's arm was limp in my hand.

Merk trembled.

"Inside!" a cop shouted. "Got to close these doors."

"Injured person," I called back.

"It's you or all those in here, son." Loss of air pressure in the tunnel might come at any moment, I realized.

"Linda," I said, tugging her arm as I stood up.

"You go," she said, pulling free of me.

I heard the door closing.

"Jake—they're locking us out!"

"Coming!"

"Kik!" Linda shouted.

"He's gone," Jake called more softly.

The lights went out. I turned and saw that the door was three quarters closed.

"Kik! Bring him up—Jake do you hear me?"

"Head's caved in where he hit," Jake said. "His neck is broken and he's stuck on some sharp rocks. No breathing at all. Get going, both of you! Can't see. Got to feel my way up." His voice broke and I remembered that they had been friends.

"Let's go, Linda." My eyes were adjusting to the light still coming through the open door.

She let me pull her up. "You bastards—you'll leave him there," she mumbled through her tears.

The cop cursed as the crank jammed.

Even if there had been time for Jake and me to bring up the body, Kik was too damaged for freezing, even if we'd had the facilities, which we did not.

Jake climbed up over the edge. We took Linda by the arms and led her to the door.

"Give me a hand," the cop said as we pushed her inside.

The three of us worked the crank. It turned slowly, and I thought it might break, but finally the doors closed—just as the ground trembled again.

"What now?" I asked. Linda was on the floor nearby, crying softly.

"We wait for help," the cop said, looking at me with gray eyes. He couldn't have been more than five years older than me. His ruddy face was flushed from effort. Sweat ran down from under his cap as he wiped his forehead with a sleeve.

"Is that likely?" Jake asked.

The cop nodded. "The whole warren couldn't have been affected."

We turned and walked to the platform. Most of the kids were sitting on the floor. Bob was on the platform with the other cops, trying to get through on the intercom.

"Cable's gone," he said when he saw me. "At least from here out. It's happened before. They'll come and get us, eventually."

Rosalie was suddenly next to me. "How long?" she asked.

Bob shrugged. "Depends on the damage."

"But what do you think?" I asked.

"Don't worry—the Control Center can survive anything."

I looked around at the kids on the floor. They looked patient, resigned; they'd gone through this before. Many of them, I realized, had probably lost friends and relatives. Kik was gone, I reminded myself. We hadn't been exactly friends, but I had come to like him from a distance.

"We'll know soon enough," Bob added. His parents might be dead or injured, for all he knew. "Find a comfortable spot," he said confidently. "Air seems to be coming in well enough. We'll have to wait."

I noticed the way everyone looked at him. He was Robert Svoboda's son, after all. I wondered what good that would do us if nothing could be done.

Jake was kneeling by Linda. He kissed her cheek and put his arm around her. I realized how close he had come to dying; the fissure might have closed at any moment, or another shock might have thrown him deeper. All three of us might have died if the tunnel had decompressed—but Linda, I realized with a sudden sick feeling, had now lost all the family she had left.

Ro and I climbed up and sat on the edge of the platform. A few faces glanced up at us from time to time. Linda seemed to grow calmer as Jake held her. They seemed very alone on the open floor, away from the crowd around the platform...

I was in a kind of shock myself, I suppose, as the situation sank into my mind. The universe is a one-way street; you can't always know what it's going to do to you, and you can't do all that much back. We've learned a lot, and we're going to know a lot more before the Sun dies—but what was happening here on Mercury was the result of what we had done to ourselves; many people had seen it coming—but why is it that some see and others don't? I was a bit frightened, and one of us had died, but the Mercurians had been living with this kind of danger for decades.

The lights went out. A cry of surprise passed through the crowd. Ro's hand slipped into mine. She squeezed hard and I squeezed back. It seemed strange to be so near the Sun and in total darkness—yet something in me needed to be here, so far from home, in the blackness, before I could become myself. That was the part of me that Ro had complained about not being able to see. We all have it, I suppose, the mysterious bit of ourselves that we feel but don't often understand. The conscious part of us is not all there is. Self-conscious reason is the new kid on the block, evolution's jewel—but within us still live the impulses of fish and reptile, unthinking hunger and hatred, to which darkness and danger give a home.

"We're never gonna get out," a boyish voice said.

"Who's *that*?" a girl asked disgustingly.

"One of yours," Bob whispered. "Sounds like he may panic. Do you know him?"

"No."

"Shut up!" the same girl shouted.

"That's one of ours," Bob said.

"Can't we do anything?" the plaintive voice asked. My stomach swam at the sound.

"Eat your way out!"

"Come on, you two," another girl said.

"Leave him alone," a husky female voice answered.

"He had it too good on Earth. Serves him right!"

"Earth! That's where you have to wear a strap to keep your balls from dragging on the ground!"

"Boobs too!"

There was some laughter. It was only human to be resentful, I thought bitterly. *Only human*. Why weren't people better inside as time went on?

"Cut it out!" Jake shouted from near the doors. "Insult us when the lights are on."

"Just keep yapping, I'll find you."

"Okay," Bob said. "Stay put—or you'll have to deal with me later."

"That goes for me too," the cop said from somewhere on my right.

"Who are you?"

A light flashed onto a face. "Sergeant Black. There's five of us in here, so behave." I recognized the ruddy complexion.

"Ooooooooooh!"

Everyone laughed.

"I know that's you, Ted," Sergeant Black said.

"Big deal," a girl's nasal monotone replied.

"Helen Wodka? I can tell it's you."

"Whattyyaa—a voice printer? She's not even here, stupid."

"Cops could help out with work instead of following us around all week."

"Hey kid—I work two shifts!"

"Crawl away!" Miss Nasal shouted.

"Why do you have it in for me?" Black demanded.

"Get lost!"

Someone laughed nervously. The darkness was taking away the normal walls between people; you could say what you wanted. The fun of the evening was gone, and nothing could be done against old Merk, but cops and strangers were easy targets.

I had a sudden vision of a long chain of *because*s locking together to trap Ro and me here. Political delays in giving the aid owed to Mercury were going to cost even more lives—including mine and Ro's. The past had sealed us into this hall. I waited for someone to start picking on earthies in earnest, but it didn't happen.

We listened to each other's breathing and to the sound of the ventilator. My eyes were wide open, searching the dark for a spot of light. I began to see patterns of brightness in the blackness. Kaleidoscope universes burst and reformed, one creation after another dying in my brain...

"Black—are you there?"

"I'm here, Helen."

"Sorry, Black."

"Me too," Ted added.

A few more apologies whispered through the hall. I heard a click—a lighter blossomed, and I saw our shadows sitting on the walls. The darkness closed in again, and after a few moments I saw the red ember of a cigarette hanging in space.

Black speared the offender with his flashlight beam. "Put it out—our air might not last." The beam died before I could see the smoker. The red spot dropped and died as Black's words sank in.

"There must be something we can do!" Linda cried.

"What do you suggest?" Black asked calmly, and it seemed to me that these people were so beaten down that they didn't want to do anything. Suddenly I wanted to run time back, so that Kik would come floating out of the abyss, alive and whole, even if it meant that we would have to live backward from then on.

Linda's voice had made me edgy. I wanted to move around, fight back. It couldn't be very serious, I told myself, if Bob and the cops were so calm. It was just a minor inconvenience. The lights would go on in a moment and the dance would start up again. But working with Bernie had taught me to be suspicious; anything that could go wrong would go wrong.

"Listen," Bob said. "Everyone be quiet."

I heard only breathing. Ro squeezed my hand, and we both knew what had happened.

"We're not getting any air," Bob said in a sinking voice. "Can't hear the ventilator..."

I tensed. "Must be blocked," Helen said.

"Don't move around—relax," Black said. "We'll make it last. This is a big hall."

But there are a lot of us, I thought.

"Can we tell if there's air in the tunnel without opening the doors?" Jake asked.

"No," Black replied. "It may be blocked even if there's air."

"Can't we crack it a bit and listen for a hiss?" a boy asked, and again I realized how ancient much of the technology here was—there should have been pressure sensors on the doors, so you could tell if there was air on the other side, or what you would be breathing.

"Don't talk stupid," Helen Wodka said. "Why risk a stuck door when all we have to do is wait. A small leak will kill us sooner if we can't close the door, if we're not sucked out into a vacuum first."

"We can't touch the door," Black added.

"How long can we breathe?" I asked, knowing it would be an unwelcome question.

"Depends on how much we use."

"You mean we can go quietly, lying around," the sad-voiced boy said bitterly.

"No more talk like that," Black answered firmly.

I put my arm around Ro's waist and held her tightly.

"What if the rest of the warrens got clobbered?" Jake asked.

I heard Bob take a deep breath.

"Leave some for the rest of us," a girl's voice said.

"Unlikely," Bob replied. "It's never happened—they'll get us out." He was sounding less convincing.

"There's got to be something we can do," Linda said again, more calmly. Again I felt the pressure to act, even though I wasn't feeling much like Tarzan.

"Bob," I said loudly, "—are the ventilation shafts large enough to crawl through?"

"Sure," he answered, "but there's probably nowhere to go. The one leading out of here is probably crushed. You might not be able to breathe."

"We should explore," I said. "We can do that much."

"It's worth a try," Black said. "We might restore air flow if the blockage is nearby."

"I'll go," Jake and I said at the same time.

"Both of you go," Bob said. "The buddy system is safer."

Someone stumbled toward the platform. A flashlight blinked on, throwing the beam into the high vault of the hall. "Here," Black said, reaching up to me, "take my light."

"We need another," Bob called.

I took the light and cast the beam across the crowd. One of the cops handed his over at the edge of the seated crowd; the flashlight passed from hand to hand until it reached Jake.

"The shaft is behind us," Bob said.

"Don't lose those lights," Black said.

I kissed Rosalie. "If you die I'll kill you," she whispered.

"Let's go, pal," Jake said.

We turned our beams onto the wall behind the platform and found the grill.

"About four meters up," Jake said.

"Roll the platform over," Bob said. "It's on coasters."

A dozen people pushed the stage up against the wall.

"Get on my shoulders," Jake said.

I put the flashlight in my chest pocket, so the beam would shine upward, and climbed onto Jake's shoulders. The grating felt solid when I pulled on it.

"Doesn't move even a little." Then I jerked harder and it came loose. "Look out." I dropped it near the wall and heard the clatter after the slow fall.

Jake boosted me into the shaft, where I turned around carefully and looked out over the hall. Dark lumps sat in the center. Shadowed faces peered up at me in the faint light.

"Coming up!" Jake called.

"Come ahead!" I backed into the shaft.

Jake's shape appeared in the opening and pulled itself in. I caught his face in my beam for a moment. He coughed and crawled toward me.

"We're in!" he shouted over his shoulder.

"Be careful," Black answered.

I turned and crawled ahead with the light in my left hand. There was no movement of air in the pipe.

"It branches here," I called out after thirty meters. Shining the light to the right, I saw that the passage went on for a few meters and came to another grating. "What's next to the auditorium?"

I waited as Jake relayed my question. "Bob says go ahead," he shouted back. "It's the police station."

I crawled to the grating. "It's blocked with debris on the other side—cave-in!" I backed away. "I'm going to try the left-hand pipe."

My light flickered as I slid forward. I turned it off.

"Can't see your light!"

"Saving it!"

The dusty air was getting harder to breathe. I crawled for what seemed an hour, scraping my knees and coughing.

Finally I stopped and flicked on my beam.

And froze.

"The pipe's crushed!" I shouted, choking. It was like a bent straw. I struggled to control my coughing.

"Are you okay?"

"Yes!" I wished he would shut up.

"What?"

"I'm fine!"

I killed my light, turned, and started back, wondering how many of us would die. Help would reach us—but did anyone know we were running out of air? I thought of my life on Earth and Bernal. How small my problems there now seemed. I was drenched in sweat. There was less dust but the air was beginning to taste bad.

"Joe!"

"Coming," I croaked with a dry throat.

You never really believe you're ever going to die. When you imagine it, you stand outside yourself, watching yourself go, and you're still *there* when it's over, watching from some fabulous beyond...

I heard breathing.

"Jake?"

His light went on. His face seemed old and afraid suddenly. "What's wrong, Joe?"

"Gotta rest." I lay down and put my head on my arms. "There's no way out..."

"Then we'll just have to last."

"I guess ..."

My eyes were wide open in the dark, and it seemed strange to be Lying there, doing nothing. I forced myself up on all fours.

"We'd better get back," Jake said.

He retreated to the opening, left his light for me to see by, and lowered himself over the edge until he was hanging by both hands. I came forward, picked up his flashlight and shone it down on the platform. Jake dropped slowly onto both feet.

"Catch." The flashlight fell like a dying star into his hands. I crawled over the edge, held, then dropped. Hands steadied me as I came down.

The air tasted better. I saw Ro's face. She was biting her lips.

"We'll have to take it easy until help arrives," Jake said. "Joe says both ways are blocked." I sat down against the wall. Ro sat down next to me. "What's going on?" someone asked from the floor.

Silence.

"Well?" the same male voice asked. "What have you big shots come up with?"

"Didn't you hear!" Jake snapped. "We'll have to wait."

I heard murmuring and cursing.

"There's gotta be something ..."

"Ted—is that you?" Bob asked.

"Yeah, I'm not a lump yet."

"We'll use less air," Bob said.

"And when that's gone," Ted continued, "we'll have to open the doors. We won't have anything to lose then—and who knows, it might be all right out there."

Again, there was a nervous silence.

"We should have been living in a habitat by now," Helen Wodka said. "What took you people so long? Explain *methat* ."

"Serves you right," Ted added.

"Don't be stupid," Bob said. "They came to help."

"Save your breath," Black cut in. "Get some rest and leave some air."

Jake clicked off his light and sat down at my other side.

I won't wake up, I thought as I closed my eyes. This dark will be the last thing I see. There was a lot of shifting and coughing in the hall. Ro rested her head on my shoulder.

I woke up suddenly, surprised that I had been asleep, and took a slow, deep breath. Cool air flowed into my lungs. Ro was curled up against me. The ventilation, I realized, had also brought heat into the hall. We might freeze long before we stopped breathing.

"You awake?" Jake whispered at my right.

"Have we been asleep long?"

"Six hours by my timer."

"Shouldn't you be with Linda?"

"She wanted to be by herself—don't worry, she's okay."

"Do you think the cop station leads anywhere?"

"You're thinking of punching through the blocked vent," he said.

"It's better than this."

"We might strike pure vacuum. And vacuums abhor people who try to breathe them. Might as well risk opening the front door."

"True," I said, "but if there were people in the room beyond the blocked vent, they probably kept their door to the tunnel closed."

I heard him sit up. "Possible—I should have thought of it. Must be lack of oxygen. So we won't breathe

vacuum—but what else will it get us?"

"Bob," I whispered.

"I heard," he said. "Two tunnels lead off from the station. The same one we have out front, and one from the back."

"There should have been another way out of here too," I said.

"We planned to melt through another," Bob said.

"Look," Jake said, "even if we can't go anywhere from the station, we might get some air flowing in here."

"Maybe," Bob replied.

"Hey—shut up!" a male voice whispered loudly from the floor.

"I already know the shaft," I said. "Is there something I can dig with?"

Jake turned on his flashlight, stood up, and moved toward the screen unit, where he bent over and squatted under the console. After a minute of scraping and squeezing noises, he unbolted a meter length of shiny steel. "This should do," he said as he brought it to me.

I took my light and turned it on. It seemed to be working, so I attached its magnetic surface to one end of the rod and gave the assembly to Jake.

"Shine the light at the opening," I said.

I climbed up on his shoulders and pulled myself inside. Then I turned and reached down for the steel.

"I'll come up and stay at the mouth," Jake said as he handed it up. "Yell if you need help."

"Right." I crawled inside, pointing the beam ahead.

Breathing became harder again. I slowed, inhaling evenly. No point in passing out.

Rest, I told myself as I came to the turn, but I didn't stop; every delay would leave me weaker. I was stirring up dust. My eyes filled with tears, and I began coughing.

Closing my eyes tightly, I felt my way forward until I touched the grating with my rod. I put it down and took out a handkerchief. Wheezing, I struggled to tie the cloth around my face.

I began to spit, bringing up gobs of dusty mucus, drooling over myself. I thought I was going to throw up, but the heaving stopped as the fabric over my nose and mouth began its filtering action. I was still getting stuffy air, but it was cleaner.

I lay down and rested, breathing slowly until I felt better; then I forced myself up on all fours again.

Removing the light from the rod, I placed the beam to shine on the grating. Slowly, I struck the rocky debris, pushing the rod through the grating to loosen the material on the other side.

There might just as well be a hundred light-years of stone ahead of me, I thought, and even if I broke through, there might not be any air on the other side.

I jabbed at the rock a hundred times, goaded on by visions of it falling away. People would die if I failed. Rosalie would die.

The light flickered. I reached over and turned it off, angry at its old design; everything on Mercury was obsolete. I knew the small space well enough by now to work in the dark. Might as well save the light, whatever there was left of it.

I picked at the wall of rubble, insisting to myself that I would find myself on the other side if I didn't weaken. My future self was waiting only a few minutes up ahead, alive and out of danger. I needed him, even if he no longer needed me.

As I worked and sweated in the dark, I wished that he would reach across from his side of time and pull me through the rock to safety...

My heart was beating wildly as I chopped at the grating, ready to explode in my chest; and the blackness flowed in around me, imprisoning me as it solidified.

[|Go to Table of Contents](#) |

17

The Squeeze

All the air had disappeared into the future.

I lay still in an endless present, unable to breathe, eyes open, listening to the dark, wondering if they were all dead back in the hall.

Something shifted, gritty and stonelike; a trembling passed through me. I strained to hear beyond the pounding of blood in my ears, fearful that the coming quake would crush me.

Then a soft breeze wandered in from the future, slipping into the pocket of the past where I was trapped. I pulled the coolness into my lungs and waited for the fresh air to dry my face. I inhaled deeply, and with a jolt my body resumed its forward motion in time.

I sat up suddenly and groped for my light.

"Joe!" Jake's echo stabbed into my ears.

"I'm okay!" I found the light and turned it on.

"Air's flowing," Jake called.

I turned the light on the grating and saw a small opening at the top right-hand corner, where the tremor had probably loosened the rockfall.

I seized the rod and began to widen the break. When the breach was larger, I put down the rod and positioned myself to use my feet.

I kicked.

The grate gave a bit on the second try, more on the third.

I gulped a deep breath and whacked it a good one. The grate sailed away into the darkness. I listened to its clattering, unable to believe my luck.

I heard coughing. "Who's there?" I demanded.

"Need help?" Bob answered.

"Come ahead—I've cleared it!"

"Joe?" Rosalie asked from what seemed a great distance.

I cast the light into the tunnel and saw her. Linda and Bob were behind her. "We felt the airflow," Bob said.

"What kind of room is behind us?" I asked.

"The floor of the jail is no lower than in the hall," he answered.

"Go on through," Linda said impatiently.

I turned the light and crawled through the grate opening. Perching on the rubble, I searched the room with my beam. It was a cell block.

"It's the jail, all right," I said, realizing that the barred doors might be locked from the outside. I was squatting on a huge pile of rock that had fallen against the wall, high enough to cover the vent. The ceiling of the chamber was cracked, threatening more falls. Bob crawled out next to me.

"There's no one here," I said, illuminating the rubble all the way to the bars.

"Might mean they got out. The doors may be open."

I started down, but my foot caught on something. My light revealed a human arm, and for a moment I wondered if by some miracle it had grown out of the rubble. The palm was open, as if to shake hands. I checked the pulse, but the limb was stiff and cold.

"Dead?" Bob asked.

"Yes."

"Hey!" Jake called from the far end of the shaft. "The lights have gone on in the hall!"

Bob poked his head back into the opening. "Try the screen intercom again!"

"Doing it now!"

We waited.

"No luck! There go the lights again!"

I scrambled lower and turned to give Bob some light. He reached me, and we picked our way to the bars. "Whose hand would that be?" I asked.

"Probably one of the recent ex-cons."

"You lock them up?"

"Oh, no. He might have been in for being drunk, or something. Many of them use the jail to sleep in. We don't have room, and they don't mind."

"You mean they keep to themselves."

"Some do, some don't. If they marry, they live differently, but that doesn't happen too often."

Bob grasped the bars with both hands and pushed. I helped, and we managed to slide the door open. He took out his flashlight and played the beam back over the rubble.

"I hope most of them got out," he said. "Come on down!"

Linda and Rosalie crawled out of the vent and made their way down the pile. Neither of them stopped or said anything when they saw the hand.

"Listen," Bob said.

"What?"

"Air—coming in from the other shafts."

I heard a steady whisper.

Linda and Ro reached us, and Bob led the way out into the station. We saw no more bodies. The place was deserted, even though the damage seemed light. I wondered how many bodies might be hidden by the rubble in the cell blocks.

"This is the complaint room," Bob said.

Empty chairs faced the judicial bench. The screen was flashing a ghostly light across the wall behind the bench, reminding me of fish swimming in an aquarium.

Bob sat down behind the bench and punched up a call on the terminal. "Can't get anything," he said finally.

"What now?" Linda asked, sounding strangely composed.

Bob looked up at us, his face pale in the flicker. "Well—we can't risk opening the outer door to the tunnel from here either. We're right next to the hall, but we're getting air in here and it's moving through to the others. We're all safe for the moment. I don't want to do anything to make things worse. We can last a long time with air."

We all sat down in the first row of chairs.

"They'll get to us eventually," Bob said from the bench. "The Heat Mole digger always comes through damaged tunnels and reseals them."

"But when?" Linda asked.

"Could be a few days, but there's a kitchen in here. We can move some of the kids out of the hall—"

"What if it's so bad they can't do anything for us?" Linda insisted. "Shouldn't we face that possibility?"

"Unlikely," Bob replied, shaking his head. Again, he seemed unwilling to admit that it could happen. "If it drags on, the asteroid people will arrive and lend a hand. We can last a long time with food and air..."

"Bob," I said gently, "could they be all dead? How would we know?" I glanced at Linda. Her dark shape was watching me.

"The Control Center can withstand anything. They'll get us out."

Linda sighed. "People have been dying here."

"I said the Control Center, not the whole place." His voice trembled.

"Hello!"

"That's Jake," I said, standing up.

I rushed back into the cell block. Jake was crouching inside the vent, shining his light down. His beam caught me in the eyes as I reached the bars.

"Will someone tell me what's going on?" he said.

"Start bringing people through. Bob says there's a kitchen."

"Can we fit everyone?" he asked.

"We'll call a halt if it gets crowded."

He stared at me for a moment. I blinked, and he was gone.

The first group was coming through when the cell block ceiling caved in again. I heard the sound and started toward the block.

"Don't!" Bob shouted from the console, where he had been working to contact the Control Center.

"They may need help!"

"Should have stayed," Linda muttered.

I listened for tremors, clicked on my light and approached the doorway. Dust was drifting out, a stately motion of particles wandering in my beam.

Coughing, Jake and a few kids staggered out. I flicked my beam across them, looking for signs of injury. Linda and Ro rushed up to them, and we settled them into chairs.

I went through the door and down the short corridor, and saw that all six cells were filled in with rockfall. I couldn't even see where the ceiling had been. I turned and staggered back.

"How many were with you?" I asked Jake.

"Seven or eight more—but some were still in the pipe, so they'll make it back into the hall."

"We're cut off," I said. "The hall is not getting air again."

I looked around in the ghostly light. Ten of us had gotten out—ten out of a couple of hundred.

"Who's here?" I asked.

Bob called out their names: "Helen Wodka, Ted Quist, Jenny Miller, Frank Givenchy, Hank Golden."

"Sergeant Black was right behind me..." Helen said.

"Did he come out of the vent?" I asked.

She nodded.

I turned off my flashlight, and we sat in silence for a few moments. The flickering screen cast Bob's shadow on the wall behind the bench. He was hunched over, working intently to reach through the intercom lines, and it seemed that he was playing a strange game of some sort.

"Who else came out of the vent?" I asked.

"I was next to last," Helen replied.

"So he's the only one we lost." Not counting those who were already under the rockfall, I thought, and assuming no one was crushed in the pipe.

"Maybe we should try to dig through to the vent," I said.

"With what?" Jake asked. "It would take a week."

"I don't hear the air coming in," Helen said suddenly.

We listened to the silence, hoping that it was just a trick of hearing.

"The inlet's here above the bench," Bob said.

I turned my torch on it. He climbed up and held his hands against the grate. "Nothing—it's blocked."

He jumped down and slumped into his place behind the screen, and I realized that the air system was being cut at more than one point.

"The sensors at Control have to be showing which air lines are gone," Bob insisted. "They must know the fix we're in by now."

If the feedback warning system was still intact; if there was anyone to read the sensors. I had no doubt that someone would get us out. Eventually. Dead or alive. It just didn't seem likely that we'd remedy our local lack of *airtwice*. How much luck can you have in one day? Breathing was beginning to seem a luxury.

I had a wild thought.

"Bob—can't we get up to the surface and cross over to the Center? There are only ten of us."

He stared at me from across the room, his face distorted by the cold flickering. The strain of the last hours was beginning to show. He no longer seemed sure of anything. Maybe his parents were dead, he was telling himself; after all, they were flesh and blood, as easily crushed as the people in the cell blocks. They weren't immune—anyone could be dead. It seemed clear to me that Bob knew by now that this situation was different from the ones he had survived in the past. The quake had probably affected a larger area, and there were other things to consider.

"There are hatches to the surface," he said finally, "and we could probably find a few suits, but—"

"You and I'll go for help. They may not know—"

"—but the Sun is up," he said, shaking his head in despair. "Even with a suit, that's no protection at all."

"Then why have suits at all!" I shouted angrily.

"It's pretty safe at night."

His face darkened and faded away as the screen died, leaving us in total darkness. "Save the flashlights," Jake said.

"Isn't anything good enough?" I asked.

"Sure—the shielded vehicles," Bob replied, "but if there's a solar flare, forget it. Nothing will do. Instant crisp human."

Jake snorted.

"Are there any vehicles nearby?" I asked. Questioning him was like pulling teeth. He seemed dazed.

"Don't know."

"Well, let's go find out!"

"You'd still have to cross some surface to get one."

"What if one were close by?"

"We could make a dash for it, but the radiation dose might still be bad..."

"Tell them the truth," Jake said.

We waited. "I'll be very honest—it's never been this long. Too much seems to have gone wrong this time. Pockets like this may be all that's left."

"So you don't think we're going to make it," Linda said.

"I've lived here all my life. You get a feeling..."

I stood up in the darkness. "Feelings, my ass! Where's the hatch, the suits?"

"Could use a suntan myself," Jake said. "Always wondered what it would be like to look that big Sun in the face." I couldn't tell if he was joking.

"Maybe we should just wait," Helen Wodka said.

"If there are hatches, they were meant to be used," I insisted. "Where are the suits?"

"I think we can reach one of the utility rooms," Bob said cautiously. "There's a door to your right."

I turned on my flashlight and found it.

"I'll go with you," Bob said.

I walked over and tried the crank. It turned easily.

"Crank it shut after us," Bob instructed.

"What if you don't come back?" Linda asked.

"Then you'll just have to wait for help," Bob replied as I cranked open the door.

Ro came up to me. "Joe—are you sure you want to try this?"

"There's no choice," I whispered. "The air in here or in the hall won't last forever." Bob took my flashlight

and shone it into a long, dark corridor. I put my arms around Ro and held her close. "Do you want me to wait here and watch you suffocate?"

We kissed. "I just wanted to know that you feel sure about going," she said.

I turned away quickly and followed Bob. We heard the door cranking shut behind us.

"Here it is," he said as we came to another door.

I turned the crank. The door opened, and we stepped inside. Half a dozen suits hung on the racks.

"These are useless against the Sun," he said wearily, "and it's more than two kilometers to the Center. We can't dash that." He had lived here all his life. What could I possibly know?

"Wait a minute," he said suddenly.

"I'm thinking the same thing—we'll have to go up and see."

"I don't know. There may be no way to check except by opening the airlock." He still didn't sound too hopeful.

"If we could get to the Center," I said, "we could come back in a shielded track bus, dock with the airlock, and take everyone out. We could do that, couldn't we?"

"It would be funny if we died out there and help arrived anyway."

"We could be just as dead thinking like that," I said. "How long can they last back in the hall?"

"Let's suit up," he said.

We held the light for each other, and checked each suit as we put it on. Our helmet lights went on when we closed our face plates.

"These are ancient," Bob said over the suitcom. "Not much use for them." He pointed upward. "Let's go."

My helmet beam shot up into a rock chimney. A ladder rose for at least thirty meters and disappeared into the dark.

We climbed, listening to each other's breathing. The suits seemed to be working well, despite their age.

"Stop," Bob said after a long while. "Here's the inner lock crank." I heard him struggling above me.

"Okay, it's open." His feet disappeared into the opening. Lights came on.

I climbed up after him. "The lights work in here," I said.

"Independent source. Solar."

"What now?"

"You stay here." He started to crank the door to the outer chamber. Suddenly the door slid open. "Must have triggered an automatic."

I followed him inside, ignoring his instructions. The inner door closed behind us.

He pointed. "Look—we'll be able to see!"

There was a small round viewport in the outer door. We could check the Sun's position without having to open the lock.

[|Go to Table of Contents](#) |

18

Crossing

I stood behind Bob as he peered through the thick viewport.

"Can you see anything?"

He gave the port a wipe with his gloved hand. I heard crackling, then his voice in my ear. "We're in the shadow of those cliffs to the left. I think we can walk to the Center."

"You don't sound too sure."

From what I knew, Mercury was crisscrossed with scarps—huge, curving cliffs up to four kilometers high. They were formed when Mercury's crust was cooling and shrinking and massive blocks were being thrust upward along fault lines. One particular cliff, Discovery Rupes, was 500 kilometers long.

"The Sun is low this time of day," Bob continued, "but I can't tell how close it may be to the top of the scarp. It isn't noon yet. We'll have to hurry, in case the Sun clears the top and zaps us."

"Is that all?" A few kilometers in low gravity was not going to be difficult, but I was thinking only of myself.

"I don't know if the surface lock to the Center is in shadow or not. I've never come this way."

"So we may have to sprint a few yards."

The crackling filled my ears. "We can't do that, Joe. Get that through your head. Not in this suit or any other. By the way, have you ever walked around in a suit?"

"No."

"Move carefully—don't let it get damaged."

"Do we have enough air?"

"They're rebreathers," he said. "Packs can recycle indefinitely."

"Okay—let's go."

He tapped the door control with his fist. The door slid open, and we stepped out slowly onto the coppery surface.

I looked up, grateful to see the stars. Somewhere out there, away from the Sun, was Venus, orbiting only 50 million kilometers away; and Earth, 91 million kilometers distant. At my right, the wall of cliffs hid the fiery Sun, which was waiting, it seemed, to rise up and burn us as soon as we started across the shadowland, because it knew that we were out here, and that only chance had given us the protection we needed.

To my left was a sea of light. There the shadows came to a sharp end. Slowly, as the Sun Climbed, that

sea would creep toward the cliffs, dissolving the shadowland; we would be forced against the base of the scarp if we stayed out long enough. At noon there would be almost no place to hide; the solar eye would cook us with its fusion gaze ...

"I think the locks to the Control Center are there," Bob said, pointing into the blackness. "If we keep close to the scarp at our right, we'll be protected all the way."

Noon was still weeks away, I told myself. There was no way the Sun could get us, but Bob sounded as if there were other things to fear.

"So what else can get us?" I asked.

"Micrometeorites. They pelt the surface. No atmosphere to burn them up. Go through you like a bullet, if you're hit. Unlikely, but the idea always gives me the creeps."

"We won't be out long enough," I said. "Let's get going."

"Just a moment—I want to try something. Control, please reply, this is Bob Svoboda ..."

Of course, the suit radios.

Bob repeated his call a few times, but the only reply was the universe making popcorn.

"Why don't they answer?" I asked.

"It could be a number of things. Quake might have damaged surface antennas. No one's expecting a call from the surface, so there may be nobody listening, nothing more." I knew that he thought it could be something more, but he was determined not to start supposing. "Come on."

I followed, avoiding loose rocks, stepping only where the coppery way seemed firm. It was an easy stroll, despite the bulky suit; but my muscles were used to a higher gravity, so I didn't notice the suit's weight as much as Bob did. I began to stride, then took a small leap forward.

Bob stopped and fixed me with the mirrored eye of his faceplate. My ears crackled. "Don't, Joe—you can still break a limb or tear your suit."

"Sorry."

I thought of Ro as we passed deeper into the shadow of the high cliffs. What would there be for us after we finished working here? More school—and then what? My heart seemed to hesitate between beats as I realized that I might never see Ro again. She was probably thinking the same thing. I faced the possibility that one of us might die.

I glanced up at the scarp. It was hard to feel how tall the cliffs were; they seemed unreal. All of Mercury had been molten once, cooling from the outside in, buckling the outer crust as it formed, forcing sections to pile up on each other while swarms of meteors, even asteroids, bombarded the planet. The scarps were what geologists call thrust faults, where one side of a crack has been raised and the other lowered. On Merk they cut through mountain ranges, craters, and valleys. The Sun's energy had sculpted this world, and left it half finished. The interior was still molten with heavy metals—the ultimate prize, which humankind would claim as we reached deeper into the planet.

We had been marching for about fifteen minutes, pulling our legs up and down like robots, when I felt a gentle trembling in my feet.

Turning to look back, I saw a crack following us, like a beast tracking prey; its speed was deceptive.

"Bob!" I jumped aside and turned around in time to see it shoot toward him like a crooked snake.

I took giant steps and tackled him. My weight threw him clear, but my feet went into the crack as it passed us. It would have been a sorry tackle on Earth, I thought as I reached out and caught the edge.

I hung there.

Bob was about five meters away, down but moving. I pulled myself up, grateful that I was from Earth. Growing up there had all been for this—so I could come here and tackle Bob. Funny what goes through your head in moments of danger.

I got up and walked over to him. He was sitting up, holding his left sleeve. "A small tear," he said, "but I've got a good grip on it."

"Are you hurt?" I asked, realizing that I was responsible—but there had been no choice.

"Fine—but I've got to keep this closed. One day we'll have new equipment."

I reached down and pulled him to his feet.

"Sneaky crack," he said.

"Sure was."

It was still running ahead of us, parallel to the scarp.

"Can you hold that?"

"Sure—let's go."

He tried to lead the way again, but I was at his side.

"It can't be far now," he said.

I peered into the inky shadows ahead. "What's it look like?"

"Silver dome—three meters high."

"Don't see a thing yet."

"It's got to be there!"

I felt his confidence draining away.

"I could have sworn this was the right way, Joe."

"Don't worry—if it's to our right, we can still step over the crack. Hope it doesn't widen."

His breathing seemed more labored over the suit com. "Follow the crack."

"How do you feel?"

"I'm okay!" he insisted.

We marched in silence.

"Look at the pedometer in your helmet," he said. "We've come half a kilometer."

I noticed the ghostly row of dials. When I looked out again, Bob was four meters ahead. I caught up.

"Not much you could do if my suit went," he said.

"Try calling again," I said.

"We'll make it, Joe."

"Bob, play it safe—right now."

"They've got enough to worry about."

"Try."

"We'll get there. Don't you see? Ripping a suit is ... well, basically a dumb thing."

"But I did it—not you." I saw Kik falling. One gone, one saved. It couldn't count for much with Linda.

"We Earthies are pretty clumsy guys. One of your folks would have known better."

"Thanks, Joe." I knew Bob still had his pride; I could hear it in his voice. But he might still try to take the blame for ripping his suit, the kind of mistake only a kid would make. I had to make sure I spoke first and saved him the embarrassment.

I kept looking at his sleeve. His whole hand was closed on the rip. What was a human hand doing on Mercury? I asked myself as we marched. It had grown up in sun filled forests and on grassy plains, gathering skills for an awakening brain. Too many hands and minds from Earth had died on hostile Mercury. I would get Bob to safety, and I would help build a new world for him to live and work in.

The shadows shaped themselves into faceless figures, closing in to whisper strange thoughts into my head. I was sweating heavily in the suit.

Bob stopped. "We've gone past—can't be this far. Must be on the other side of the crack, back some."

The ground trembled, widening the crack.

"We've got to jump across!" Bob shouted as the other side drifted away from us.

"You can't holding that sleeve."

The trembling stopped.

"It's two meters at least," I said, knowing what I would have to do. "Come here." I stepped toward him and lifted him in my arms, knowing that he had to hold his sleeve and couldn't resist. "I won't leave you out here." He had to arrive with me, as much on his own as possible; it would humiliate him to be left out here while I went for help.

"I feel stupid, Joe."

"Better than being dead," I said, taking a few steps back. "Hold that rip tight."

I went forward and jumped.

We sailed across the crack in a shallow arc, but the slowness made me afraid that we wouldn't make it.

We landed with a meter to spare. I dared to breathe again. My body shook a little.

"You can put me down now."

I set him on his feet. He was silent, clutching his sleeve. "Joe—you won't tell anyone about this. Please."

"Sure—forget it."

"I'll always remember."

"Glad to help. We're all supermen on Earth, so it's no big deal. Try the radio again. It might be easier if we're closer."

"Svoboda calling Central—please answer." We listened to the crackling.

"Good thing I can transmit by pressing down with my chin," he said.

"Bob! Where are you?" Robert Svoboda demanded suddenly, his voice clear against the background hiss.

"We came out by the surface lock over the police station," Bob said.

"Get off the surface!"

"Don't worry, Dad—Joe and I are in a safe shadow."

"You've got the greenhorn out there?"

I felt foolish.

"Dad—listen to me! We've got to run a bus over and evacuate the hall. Some people have died. Air's running out. We need digging tools. What's delayed you?"

My ears filled with hiss and crackle.

"What? We don't show any air cutoff on our big board."

"Forget the board! Is the tunnel cutter working?"

"No," his father said after a moment. "Spare parts problems—they're fixing it."

Bob cursed. "Dad—you've got to get a digging crew into a vehicle, bring it over to the cop station, cut through to the hall and start bringing people out. Police station air won't last forever either!"

"That bad—" Robert Svoboda said softly, defeat in his voice.

"Don't blame him for trying," Eleanor cut in. "We could have all been dead here, for all he knew."

"Son—you took such a risk," Svoboda added.

"Dad—how bad is it elsewhere?"

"Pretty bad, I guess. From what you've said, we can't rely on our sensor board. It's all too old—the whole system is coming apart...."

"Where are you?" Eleanor asked.

"Just near the dome—we think."

"Joe?"

"I'm here ... Eleanor."

"We're coming in, Dad," Bob said. "Should be a few minutes."

"The asteroid is here," Svoboda announced, "for what it's worth. It's a giant potato on our screens, baking in the Sun. West, thirty degrees high."

We turned and looked above the sea of sunlight. A bright star was rising in its orbit, bringing hope to the miners of Mercury, and I prayed that there would be no more disasters before the habitat was livable.

"We see it!" Bob shouted, his voice catching with emotion.

"Get going," Robert Svoboda said. "I want you two safe as soon as possible."

We broke contact and started back along the widened crack. As I looked at the landscape of white light to our right, I realized how small was our area of safety.

We stopped suddenly. A great shaft of sunlight had broken through the scarp some kilometers ahead, burning through the shadow zone to rejoin the Sun-blasted plain.

"There must be a pass up there," Bob said, "and the Sun moved into position to shine through."

I looked around, suddenly afraid of hidden breaks in the cliffs. The idea of playing peekaboo with a nearby fusion furnace did not appeal to me. Old Sol, grand light of all Sunspace, might still get us. He didn't like the creatures he had cooked up out of the primordial slime to get too close to him. I saw my body sprouting cancerous cauliflowers as it stood in a giant sunbeam....

"There's ... dome!" Bob shouted, losing a word in the static.

My eyes found the small hemisphere huddling in the shadows, daring to reflect a bit of starlight.

We moved toward it.

"Watch it," I said. The cracks were all pointing to the dome as if to a target.

"They're small. As long as we can reach one of the locks."

We were about fifty feet away when the ground shook again. The cracks opened, and I rolled into one.

I tensed, but it took forever to hit.

Finally I felt scraping and pressure from two sides. My wrist snapped, and pain jolted into my elbow and shoulder. I was caught between the narrowing walls of the fissure.

"Joe!"

"Get inside, I ordered as calmly as I could, "and send someone without a damn hole in their suit."

"Keep talking!"

"Get going!"

"Try not to move."

"Are you still here?"

Merk had me in its teeth. It had been waiting for me since the time when the planets formed. At the slightest tremor, its angry jaws would crush me; or the crack would yawn and I would be swallowed.

"Can you breathe?"

"Yes—get moving," I managed to say. "Now it's your turn."

The universe hissed at me. Mercury, the Sun's henchman, would kill me, or at least maim me, because the earthies had not cared enough to protect their own against him.

I drew a deep breath; it tasted wrong.

"Bob?"

There was no answer on the suit com. I tried to press my chin down inside the helmet, to open the radio channel to the Control Center, but I couldn't move my head.

"Bob," I whispered, "there's something wrong with my air."

The universe shoved itself into my head—a million gears grinding away, rending and tearing by fits and stops, as if trying to shape abusive sentences. Alien stars sang deep inside the chaos in my head. Solid black cement crept in around me, tucking in close, filling my lungs. I stopped breathing, grateful that I would no longer have to make the effort.

[|Go to Table of Contents](#) |

19

Looking Back

The sun reached out with fiery knives and cut away my arm and leg....

I swam through a sea of molten metal, under a giant red Sun, struggling to reach the icy coolness of the rock before the liquid metal burned through to my bones....

Rosalie waited for me on the rock. I loved her, desired and needed her more than ever—but my hands were skeletons when I pulled myself up on the soothing shore....

As the painkillers wore off, my dislocated shoulder and broken wrist, together with a touch of oxygen starvation, taught me a lot of respect for old Merk. I was so glad to be alive that I wished I might have broken the other wrist, just so as not to push my luck.

I lay there for more than a month, wondering if the planet was really done with me; a new quake might kill me as I slept. Bob and Rosalie calmed me down in the evenings, but I still had trouble accepting sleep.

When I was finally able to doze regularly, my dreams were filled with guilt and anxiety about the work that was starting without me. If I wasn't going to be part of the work, then everything that had happened to me would be meaningless. I was fixated on this, even though there was no chance of the habitat being finished before I got there.

Sometimes I dreamed that I was dying by pieces—first my legs, then my arms and torso, leaving only my head, which was not enough to go home with; they would probably just throw it away.

"Bob told us how you helped save his life," Robert Svoboda said, as he and his wife sat by my bed one day.

"He still had to hold his suit together."

Eleanor touched my hand. "He felt differently about telling us after you were both inside."

I looked up at the ceiling and felt very unheroic. "We might both have died."

"Couldn't expect you not to try something," Robert said. "I'm glad you did, as it turned out. The judgments you two made about the situation were right. Bob learned a few things. Eleanor and I had always shielded him a bit."

"I want to get to my real job as soon as possible."

Eleanor's look of gratitude was making me nervous. It surprised me that Bob had decided to tell the whole story. How would it go over with his friends? Maybe it would draw us all together.

Bill Turnbull, my orientation advisor from the university, surprised me with a visit one Friday afternoon.

"I joined up with the second wave," he said. "Brought you some letters from home."

"Thanks—how's the work going?"

"Can't go on without you," he said cheerfully, putting the sealed fax-letter copies on my table. "Half the workers are on the asteroid, building temporary quarters on the inner surface. The engineers took all the livable space in the construction sphere." He smiled. "Don't lie around here too long."

I stared at the letters after he left, afraid to open them; if you don't feed old problems, they fade away.

I picked up one and tore it open:

25 MAY 2057, BERNAL HALL, BERNAL ONE

DEAR JOE,

I DON'T KNOW IF YOU WANT TO HEAR FROM ME OR NOT OUT THERE WHERE YOU'RE PIONEERING. I HEARD YOUR NAME ON THE NEWS, AMONG THOSE WHO WERE INJURED, SO I DECIDED YOU SHOULD HEAR FROM ME.

I GUESS YOU WERE ALWAYS A PRACTICAL SORT, LOOKING FOR A PLACE TO SHINE. I KNOW I SAID NOT MUCH COULD BE DONE ABOUT THE MERCURY PROBLEM, AND I'M STILL SKEPTICAL, BUT I DIDN'T EXPECT YOU TO GO AND MAKE YOURSELF PART OF THE SOLUTION, SUCH AS IT IS—HATS OFF!

I STILL HOPE THAT YOU'LL COME BACK TO SCHOOL SOONER OR LATER. YOU MIGHT MAKE A GOOD *EXPERIMENTAL* PHYSICIST, WITH YOUR PRACTICAL TURN OF MIND. YOU ALWAYS SEEMED TO NEED PEOPLE AROUND TO DO THINGS WITH. ME, I STILL THINK LIFE IS FOR THE PRIVATE STRUGGLE TO UNDERSTAND THE UNIVERSE, THE WAY EINSTEIN OR HAWKING TO CLIMB THE MOUNTAIN OF KNOWLEDGE IN THEIR MINDS—JUST TO SEE IF THEY COULD SEE NATURE WHOLE.

Morey still sounded a million years old, but I would have been disappointed if he had changed.

MAYBE I HAVE TO SHUT OUT EVERYTHING ELSE, JUST TO BE ABLE TO DO WHAT I WANT? SOMETIMES I CAN'T BEAR TO THINK THAT THERE ARE OTHER ROADS IN LIFE, OR THAT I MIGHT WANT TO TAKE THEM AND FORGET THE SLOW CLIMB TOWARD THE WALL OF MYSTERY THAT IS PHYSICS. IF THERE IS ANYTHING THAT YOU WANT VERY MUCH, THEN YOU *MUST* KNOW WHAT I MEAN.

THERE'S NO RUSH, YOU KNOW. THE BIOLOGISTS SAY PEOPLE OUR AGE MAY MAKE IT TO 200, IF NOT MORE. I THINK YOU'LL FEEL THE PULL OF STUDY AGAIN WHEN YOU'RE OLDER. SOME PEOPLE APPRECIATE KNOWING THINGS MORE WHEN LIFE GETS CHANCY.

NOW THAT I'M WELL INTO THE BIG MATH AND TALKING SMOOTHLY TO THE ARTIFICIAL BRAIN CORES, I FIND THAT I'M DEVELOPING ALL SORTS OF NEAT SUSPICIONS ABOUT THE UNIVERSE—AS IF IT WERE SOME SORT OF STAGE SCENERY. TELL YOU MORE IN THE NEXT LETTER.

SO—EVEN THOUGH I THINK STRIVING FOR ACHIEVEMENT IS EVERYTHING, ACCOMPLISHMENTS MAY VARY, EVEN GO UNSEEN. I DIDN'T SEE WHAT YOU WANTED, BUT NOW THAT I FEEL I'M GETTING CLOSER TO WHAT I WANT, AND DON'T FEEL SO DESPERATE ABOUT MOVING ALONG, I SEE WHAT I MIGHT BE MISSING ALONG THE WAY. YOU PAY FOR EVERYTHING SOMEWHERE. IF I DON'T CONCENTRATE STUBBORNLY, I WON'T GET WHAT I WANT. ONLY LUCK, THAT SUDDEN, UNEARNED INPUT OF ENERGY FROM SOMEWHERE ELSE, ENABLES US TO SOMETIMES COME OUT AHEAD. I GUESS I THINK MOST PEOPLE ARE PRETTY HOPELESS—THEY LIVE AND DON'T DO MUCH THAT I CAN SEE, EXCEPT TO SECURE THEIR LIVES AND THE LIVES OF THEIR CHILDREN. MAYBE MOST HUMANITY ISN'T READY FOR MORE YET.

WRITE WHEN YOU CAN, OR LEAVE MESSAGES. DAVID, MARCO, AND NARITA SAY HELLO.

YOUR FRIEND, MOREY

Good old Morey, I thought as I put the letter on my night table. For once he made me feel that it didn't have to be an either/or choice. Distant moments of achievement were worth working for, if you could see that far. I hadn't been able to do it on Bernal, but his letter made me feel good—not so threatened about making another choice. Scratch that problem. I would have called him immediately, but the delays between answers would have been frustrating, even if Merk had been in position to avoid static interference from the Sun.

I glanced uneasily at the envelopes from my parents; it seemed that their words were waiting to drag me back into my childhood. I scooped up the letters and opened one.

It was from Dad:

23 May 2057, NEW YORK CITY

DEAR JOE,

WE HEARD THAT YOU WERE INJURED, BUT THE SVOBODAS ASSURED US THAT IT WAS NOT SERIOUS ENOUGH FOR US TO COME OUT, BUT IF YOU WANT US THERE

WE'LL TAKE THE NEXT SHIP OUT. I'M TOLD THAT THERE ARE QUITE A FEW GOING BACK AND FORTH THESE DAYS, TWICE A MONTH, IN FACT. I HEAR IT'S PRETTY RUGGED THERE.

WRITE OR LEAVE A MESSAGE WHEN YOU GET THIS. CALL IF YOU WANT AND SOLAR CONDITIONS PERMIT. I'LL SIT THROUGH THE DELAYS.

LOVE, DAD

P.S. YOU MIGHT LIKE TO HEAR THAT MARISA HAS GONE RIGHT INTO COMMERCIAL ART. HER LOOP SEQUENCES, MOSTLY LANDSCAPES, ARE REPLACING QUITE A FEW PICTURE WINDOWS IN THE LARGE CITIES.

I looked at the "We heard" part of the letter. Of course, they weren't together. Old habits die hard. Was he trying to lure me back home with news of Marisa? Probably not; he just thought I'd be interested. I was—mildly.

I opened the last letter.

16 MAY 2057, BRASILIA

DEAREST JOE,

I WAS WORRIED SICK ABOUT YOUR BEING HURT. I PASSED THE NEWS THAT IT WAS NOTHING SERIOUS TO YOUR FATHER AND GRANDPARENTS, BUT I WON'T REALLY FEEL RIGHT UNTIL YOU WRITE OR CALL WITH DETAILS. PLEASE DON'T KEEP ME IN SUSPENSE!

I'VE BEEN STUDYING AND READING A LOT. JIM AND I LIVE OUT HERE ON HIS RANCH. HE'S AN AUSTRALIAN, BUT HE SPENT A LOT OF TIME ON LUNA. HE'S VERY IMPRESSED WITH YOUR DECISION TO WORK ON MERCURY. SAYS HE UNDERSTANDS YOU, AND HE'S BEEN EXPLAINING TO ME.

I SOMETIMES THINK THAT IF I WERE YOUR AGE I WOULD HAVE DONE THE SAME THING. YOUR FATHER AND I ARE ON AMIABLE TERMS, SO PLEASE DON'T WORRY ABOUT THAT, MY SON.

WRITE SOON.

LOVE, MOM

Scratch another problem. I was completely on my own, and it felt good.

[|Go to Table of Contents |](#)

20

The Habitat

By the time I got up to the asteroid in mid-July, the rocky inner surface of the hollow was dotted with the lights of work camps, creating an atmosphere of underground gloom within the ten-kilometer-long space. A gentle spin had been put on the big potato, a tenth-g to start, to make it easier to move around. Teams of specialists were hard at work, even as the rest of the workers and equipment continued to arrive.

Bob and I came in through the big locks at one end of the hollow world. As we passed inside and looked out across the open space, I thought of all the work that still had to be done. It was hard to imagine that these hundreds of square kilometers of rock and mud would ever begin to look like the out of doors I had come to know on Bernal.

But it would; I knew it would—as surely as Bernal's inner surface had been changed from a curving plane of metal. When the rock crunchers finished their work, carefully balanced humus would be mixed in to create a layer of rich soil over the bedrock; ground water would run into the lakes and streams cut for it; nitrogen-fixing trees would be put in, along with plants and shrubs that did not need fertilizer, along with a select number of insects, snails, and small animals; finally, human beings would invade the landscape and make it their own.

It sounds easy when you leave out all the detailed steps, but it's hard to make an ecology work; everything is related to everything else, and you can get unexpected results if you don't do the measurements right. Strip mining during the last century on Earth had taught us the difficulties of restoring damaged ecosystems, but imagine building one from scratch.

Fortunately, our specialists had done it all before, mistakes and all.

"This seems like work for a god," I said, surveying the barrenness, "not for human beings. Can't even imagine starting on the towns. A year or two won't be enough."

"Just do the land," Bob replied, "and leave the houses to us. It'll be much easier than what we had to build on Mercury."

I sniffed. "Air isn't very tasty." It had been put in out in the Asteroids, using oxygen cracked from an ice asteroid. Industrial recyclers were cleaning up the CO₂, but the strain on the machines was becoming more noticeable as more workers arrived.

"Better than suits," Bob said. "We'll last until the trees and plants take over."

"I suppose."

"Mom always wanted an open-air patio and garden."

"She'll have it all."

"Is it time?" I asked.

"Any moment now," he said.

We gazed across the hollow, waiting. There was a distant sound from the other end, like soft thunder or something opening. I strained to see by the starlight of the work camps.

Slowly, the far end of the asteroid began to glow a dull red, brightening suddenly as the optical systems flooded the hollow with the tamed yellow-white glare of the Sun. The feeling of being deep underground was gone. A desert of rock and varicolored sands presented us with its first sunrise.

Seeing the lights go on in this drafty, dusty hollow moved me deeply, lighting me up inside, making me feel at last that I was going to be myself, and that I had found my way to what I needed.

And I realized that the Sunspace Settlements were everything that the New World had tried to be—a place where humankind could begin the world all over again, free of the Old World's conflicts. America had failed, as Earth had failed, until the sky had been opened, making available the riches of Sunspace,

giving humanity its first chance at a genuine high-energy, high-technology society, in which scarcity would no longer be the measure of economic value; *that* evil, at least, would die.

The problem of Mercury was a shameful throwback to the twentieth century, maybe even to the nineteenth, but it would soon be a thing of the past. Thirty people had died in the last quake; over a hundred had been injured. Bernie had been crushed in our room. His ashes were here now, mixed with the soil materials of the habitat. There was nothing special about that; most organic materials were recycled in some way, but I thought it was fitting anyway. For me he would always be here, alive in the land we were about to shape, as active in my mind as he was in the mind of Bernal.

"Good morning," I said finally.

"It's really late afternoon," Bob replied with a straight face. "We'll have to adjust that on the clocks."

We laughed, and a great sense of relief came over me. I had brooded over Bernie's death for some weeks, remembering that last moment in the tunnel when we had said good night so casually. It was so wrong for him to be killed right after he had regained his health. I remembered our first meeting, when he had emerged from Bernal's depths, and I knew what he would say about his death. What did we expect? That we could come here to right a great wrong and not be touched by it? I could almost hear the sound of his piping voice, and I knew that he was right.

But did it have to be you, Bernie?

I learned to run one of the crunchers, mind-linking with the machine for six hours a day. We had regular days now, with vitamin-D sunlight, which helped our biorhythms. I bit into the asteroid and ripped out huge chunks of rock, swallowing and digesting each mouthful. A fine powder spilled out the back and was mixed with organics. Dark squares of fertile land were laid over the bedrock desert, all around the curve of the world.

I also linked with the beam diggers, helping to cut the groove for the equatorial river. The lake basin was by far the prettiest piece of work we did in the first six months.

During the Christmas holidays, the engineers set up large screens throughout the hollow and fed us transmissions from Earth while we worked; it was the only way of doing something festive for five thousand people. Relatives appeared and recited sappy wishes in a dozen languages. I almost didn't recognize Mom when she came on: confident, beautiful, and adventurous-looking in her plain work clothes; an entirely new person, which she was, in a sense. Ro saw my father, but I was not at the right screen at that moment. I did get a message from him, telling me how much more gift credit had been added to my account.

The miners had a pretty homey Christmas down on bouncy old Merk, but there was no way they could have invited five thousand guests. Ro and I had to turn down the invitation from the Svobodas; we didn't want to seem like privileged characters, even if there had been enough shuttles in good working order. Besides, I was a bit wary of putting myself in Merk's clutches again.

Bob came up with a basket of goodies and spent some time with us in our tent. The ship from Earth arrived with a better class of food that week, so we did pretty well. Still, I was glad when the holidays were over. It was nice the way Earth kept us company via the screen relay casts, but the giant figures were at times irritating.

At the start of 2058, Rosalie and I were living in makeshift barracks; depending on where the day's work took us, that's where we would find a bunk. It was a big improvement over tents. Sometimes I wouldn't see her for weeks at a time. She was part of the group bringing up waste materials from Mercury. I

worried about her a lot.

As the crunchers finished munching, large waste tanks went up in each sector, and slowly the treated organics were turned into the soil. The amalgam smelled a bit, but after a time it began to give off the odor of rich, black earth. I was surprised at how much waste human beings could produce.

Think of a huge shallow pot made of rock and fill it with soil; that's what the inside of the asteroid was, basically. There was always the chance that the organic fill would die or dry out before we put in the growing things; a few sectors failed once or twice, which depressed many of us, but the bio-ecologists just shrugged and started again. When you listened to them, they sounded like a bunch of gardeners.

We laid the land deep, more than five meters in some places; you could dig down into the rock if you needed deeper basements. It was still a few hundred meters to the outer surface of the big potato, more than enough shielding from solar radiation—more, in fact, than you get from Earth's atmosphere. One of the advantages in building inside a hollow asteroid is that you don't have to provide sunstorm shelters for your workers. Building a habitat on the Bernal or O'Neill cylinder model requires a large number of solar radiation shelters until the main shielding is in place. Shelters are small and cramped, limiting the size of the work force; the asteroid provides immediate safety for a large number of workers, as well as serving as a base for future construction projects nearby, which can then follow any desired model.

There were some disagreements about landscaping. The miners had their ideas, and we had ours; but since we were doing so much of the work, many of our planners felt we should decide. The ecologists insisted that they knew best what would work in the long run. They didn't care what else the miners did inside the hollow, as long as they left the biocomponents alone; the mother-nature crew got its own way in the end. Mostly.

They started losing interest by the time the job was half done and most of the serious problems were under control; new challenges were waiting—like the Ceres project, which was just beginning out in the Asteroids.

The quick-grow trees, plants, and bushes, insect eggs, snails, fish, and small animals began to arrive long before we were actually ready for them, so we piled them in large dumps on the empty land—crates and cages, big pots, bags of special food and spot fertilizers, and mysterious sealed containers with printed notices warning you to play the enclosed instructions. At first we couldn't get enough stuff shipped from Earth, and we had to wait around for things we needed; later we couldn't stop the flow. I was astonished at how much human beings could produce when they wanted to. Eventually we used up everything, and it turned out to be just enough; someone had done a neat job of planning.

The hills of the hollow sloped gently. Three shallow valleys hugged the river, whose banks were steep to allow for gradual wear; the lake was deep and cool, just right for a nearby vineyard or two. The ecologists got the air movements right—a gentle breeze between periods of stillness. The oppressive Sun of Mercury's lifeless landscape was merely warm here, its intensity trapped within an image of itself, varying to drive the weather and nourish the greenery and people, dimming into moonlight at night; it was a dutiful Sun.

There were no extreme seasons. The thermometer might fall to ten degrees centigrade, but only because the population wanted it. Well, almost everyone wanted it that way when the meeting to decide such matters had been called.

As we completed the heavy work, half the population of Mercury was already building houses, while the other half continued hurling tribute at Earth; a surplus of metal slugs had been achieved because of the high morale, and production did not suffer. Earth was getting more consideration than it deserved.

Luckily, the next year and a half saw only a few minor quakes.

House building went quickly, but the codes required that each dwelling or town unit fit into the habitat's water, electrical, and communications system, as well as into the carrying capacity of the ecological measurements; this meant a lot of inspection and correction work.

The habitat's spin was increased to simulate fifty percent of Earth's gravity, and the orbit was made synchronous, high over the mining territories, so that the Sun's energy could be pumped constantly. Power could now be beamed down to Mercury's surface during the night by the habitat's outrider beam units.

About half the workers were rotated in the first two years; as the load lightened, specialists left for new jobs in other parts of Sunspace. Ro and I had no plans. Our credit in the bank was growing, so we decided to stay as long as we were needed. We were free to go, but we felt reluctant to do so.

Almost everyone I had known from school had gone home by 2060—to another job, or back to school. Rosalie, Linda, Jake, and I were the only ones left. About ten percent of the original work force were staying on as trial settlers.

There was a new spirit among the miners, who could now be sure that their families were safe while the shifts went down to Merk. All dangers could not be banished; quakes and accidents could not be controlled completely, but at least it was possible to get away from danger on a regular basis.

One day, when it seemed that there was nothing to do, Ro and I accepted an invitation to the new Svoboda house just outside the town in Valley One. Rosalie and I were living in the new hotel, where we were on call for small jobs. There were still some kinks in the water and electrical systems. I couldn't do much in recycling, for example, but Bernie had trained me well in electricity, wet and dry plumbing, ceramic carpentry, and in checking a variety of safety and sensing devices. That was my real specialty—troubleshooting safety sensors, knowing when they were giving reasonable feedback to the brain cores. I earned a certificate in this line of work. The closer we got to being done, the more it seemed that there were still a million things left to do. It was hard to say at what point the work ended and became maintenance.

As Ro and I approached the two-floor ceramic module house—it was shaped to suggest a small Swiss castle of the nineteenth century—I realized how much the people were becoming an actual part of our handiwork. The land was green, in part, because of organic waste recycling, and the chain of interdependence reached all the way back to Earth, into human history, and the evolution of life. Human imagination, shaking itself free of past restraints, had created space habitats. Human needs had built the mining community on Mercury. And now we had transplanted and enriched the energy systems of that community, made its use of the Sun and Mercury more humane. Formed when the solar system had been young, this asteroid was no longer a lump of rock and minerals; it had been infected with life, with mind.

At the top of the hill, a few yards from the house, Ro and I turned and saw spring blossoms floating in the river. Clouds drifted in the bright central space. The sun stood guard at the far end of the world. Overhead, the lake was a sparkling mirror. The stars were beneath our feet, just beyond the rocky crust. It was the newness of this world that impressed me daily. Earth's natural history did not apply here, yet a bit of old Earth was beginning anew.

"Well, hello!" Eleanor said behind us. We turned and saw her standing on her elaborate porch. "The rest are here, you're very late."

I looked at her shyly.

"I know, I know," she said smiling.

Ro looked a bit embarrassed. I took her hand, and we followed Eleanor inside, passing into the dining area just off the large living room.

Robert Svoboda sat at the head of the rectangular table. Bob was next to him. Linda and Jake sat at Robert's left. Eleanor seated us at Bob's left, then sat down next to me.

We all smiled. I looked at the handsomely set ceramic table, wondering at how much we had actually changed.

I didn't say much at dinner, but as I listened to Robert, I came to understand something more about the people of Mercury, and about what was happening in this sector of Sunspace.

"We won't be miners forever," he said, "but we've given humankind a better hold on this close-in space around the communal furnace. One day the resources of Mercury may run out, or become unnecessary. Materials synthesis from simpler raw materials is not far off, but when that happens we'll still have world habitats here, an economy, our own way of life. That's what will be important. Human beings are spreading throughout Sunspace. They'll be living in a thousand ways, changing physically, readying themselves for the stars. This diversity will help us if we run into an alien species. We'll need poets and storytellers to depict these different ways, just to keep Sunspacer humanity together—in its imaginative self-image, if in no other way." He was looking at me, as if he expected me to do all these things. It was right that the town in Valley One was going to be named after him.

"What will you and Ro do when you're finished?" Eleanor asked.

"Probably go back to school," I said. "We have more than enough to take care of ourselves for a few years."

"Maybe we'll go out to the Ceres Project," Ro added. "I'd like to see an asteroid eight hundred kilometers across."

I still wasn't certain about anything, but I wasn't worrying about it as much.

Later, I left Ro at the hotel and climbed into the grassy hills above the town. I felt a bit amused at myself. What had I proven? I still couldn't see beyond one problem following another, orbiting the biggest one, myself—the one I would always have with me. You push back at the universe and come out ahead. Sometimes. Problems would never stop coming at me, and I would have to do something about each and every one. They want you to solve them, and there is nothing else. I wondered if it was different for Morey. Maybe he had escaped all this, by giving himself to so much ambitious understanding. It was a way out of himself, and I still admired him for it; but I had to find my own way out of my own maze.

I lay down in the grass and flowers, and gazed up into the hollow. Sunlight was a watercolor yellow-white at this late hour, and would stay that way until morning. I closed my eyes and breathed the cool, sweet air. I wondered about my parents. There had been only a half dozen letters in the last year, but that didn't bother me; they were long letters, even if they didn't settle old problems....

I opened my eyes and saw Bernie standing over me.

"Bernie," I whispered, "you're alive...."

"They stopped looking for me, but I dug myself out," he said, smiling, looking the same as when he had come out of the hatch on Bernal.

But then my eyes opened again and I was alone, missing him.

I recalled the faces around the table, remembering the way Robert Svoboda had looked at me. If I left them, it seemed that I would lose myself again. Why is it that your sense of self is so often bound up with people you knew well or grew up with? Does the ego put a headlock on uncertainty by making everything part of itself?

Suddenly I felt that I didn't want to be anything for long. You're never really one thing anyway—except in those moments when you freeze up. Some people do it early and stay that way, unable to change. My messy face of oatmeal was nothing to fear; I was determined to grow as long as the mush held out, as long as I didn't give up. Whole cultures on Earth had died rather than change, believing that Earth was all there could be; they had grabbed bits of it and locked them away behind borders. They didn't know that the stars are suns that burn almost forever, that the universe is rich in all that we will ever need, and we can reach out if we're rich enough inside to see, to think, to imagine—more than anything to *imagine* what can be, to keep it in a store of imaginings and pass it on to our future.

Few people my age in human history had seen what I had seen—but in my time I am not very special in that. Alexander had conquered what he could see of the world at my age—and had complained that there were no others. If he could have left Earth, he would have been humbled by the planet's smallness and the true size of the cosmos; but in his time only cruelty and death could humble the rulers of Earth.

Out here there was no one to steal the land from, as the settlers had from the Indians of the Americas. Space and energy around suns were abundant, but you had to buy these resources with work and caring.

Robert Svoboda cared. Like Bernie, he loved the place where he lived because he had helped create it, becoming part of it, even though he had been born elsewhere; it was as if Mercury had been waiting for him. The miners had taken the Sun's strength into their minds and bodies, and one day that energy would flow out across sunspace not only as resources and physical power, but as art, music, and science. All the conditions for a human society were here, the makings of a culture.

I had been wrong to feel sorry for those trapped here by a lifetime of low gravity. This sector of space was their home, not Earth, however hard living here had been on their parents. I exercised, so I could go back, but they didn't care, even though the habitat's gravity increase would make it easier for their children to travel elsewhere. More habitats would be built, and for future generations of Mercurians the big Sun's light would sing eternal and be part of what they meant by home, until that faraway day when their habitats might choose to become mobile and head out to the stars.

Much of the prejudice against Sunspacers, I learned, had come from the deeply rooted notion that expansion into space meant the settling of other Earthlike planets, not building new worlds from scratch in free space or terraforming hostile planets like Venus and Mars. Free space habitats, I came to believe, were the way to go; you might be stealing nursery environments from unborn intelligences if you settled Earthlike planets, even if a particular world might seem deserted when you arrived. Your coming might actually abort a whole line of evolution.

I got up and looked at the night Sun. Something in me needed to look out at the stars, so I walked back into town and borrowed one of the bikes from in front of the hotel.

I pedaled off, away from the Sun, toward the rocky, opposite end of the world, wondering if everyone has a special home somewhere, other than the place he grew up in. I thought of my room in New York. Someone else lived there now.

Home may be where you were born, or it may be elsewhere, even in more than one place; it may be nowhere, for some people. I was still looking around. Maybe it would be back on Earth, out in the

Asteroids, or even here.

The road branched and climbed before me. I pumped up the left turn toward the lock tunnel. Above me loomed the unfinished, rocky narrows of the world. I cycled to the large metal door and dismounted. Laying down the bike, I turned and gazed across the length of the hollow.

The night Sun stood guard over the sleeping valleys. Lake and river were pale silver, hills blue-green in the soft light. There was a chill in the air, and I noticed something. There was very little sense here of a mysterious nature which had been here before we appeared. Like Bernal, this world was younger than humanity; only the Sun and rock were ancient. The rest was up front, with no hidden depths. Here nature could not kill human beings as it still did on natural planets.

I turned to face the door and pressed my palm on the lock. The massive panel slid open and I went inside. As the outer door closed, the inner one slid open. I triggered a long string of lights as I came out into the low-ceilinged corridor.

I walked to the observatory at the end of the passage, where I pressed my palm again and stepped into a large circular chamber covered with screens.

Brain-core terminal work desks stood like mushrooms in the central area. I had helped build parts of the modest observatory. From here, the Sun would be monitored and space scanned for debris and meteors; specialists would come from all over to study our star. The research station on Mercury was finally being closed down, to the relief of the staff.

I stepped up to the master controls and turned on the 3-D screens. Half were visual displays; the rest revealed the universe in narrow ranges—the radio universe, the neutrino universe, gravitational images of various sectors—all in color enhancements.

The stars turned, circling like some gigantic clockwork around the axis of the rotating hollow.

As I stood there, seemingly at the center of all immensity, I played an old game with myself, the same one I had played as a child—talking to my future self when I felt down, making him promise to remember me, to think back along the time lines of possibility to where I was in bed that night, thinking ahead to him....

And here I was, that future self, thinking back to that lonely boy who was still with me. Futures cast shadows back into the present. You move ahead as long as you can see the shadows of promises, but when you lose sight of what may be, you bog down in a hopeless present; there is nothing to pull you ahead—the self that looks back is no longer waiting for you up in the future; your future becomes the present, and soon it becomes the past. If I could keep a balance between what I had been, what I was now, and what I might become, then I would be okay for a long time.

I had come to Mercury to gain a sense of doing, of having done something that wasn't only worthy in itself, as Morey was doing, but to see the good of doing it. Morey would see the result of what he was doing later; I hadn't been willing to wait. Maybe one day I would become more patient, more willing to look for hidden values.

I didn't know what lay ahead, and down deep I was glad of it. Life had not closed itself up around me, as it had for so many people of the late twentieth century. I didn't know where home would be, and that seemed best.

Ro found me as I was cycling back in the morning.

"How is my beautiful boy?" she asked, smiling. I kissed her deeply, shivering in the morning chill.

We went into the hills and stayed in the tall grass until we were very tired.

"So you think you've figured me out," I said later. Ro was looking at me knowingly as we relaxed.

"I think so."

"We've had this conversation before, but go ahead, I'm curious."

"You were an overprotected kid. You had it easy, but you left home and found out things were very tough for a lot of people, and you felt guilty. You needed to find out—to test yourself, to do something that would give you a sense of responsibility and control. As an only child you needed other people to draw you out of yourself, and you found them. I know—I wanted the same thing."

"I know all that. What else did we find out?"

"That we can do, and learn, win out over doubts."

"Is that all? I would have thought it would be more." I was being deliberately perverse.

"Well—there was the fear of failure to overcome ..."

"What else? Come on."

"Well—you started out wanting to be like Morey but decided to be yourself."

"And is that any good?"

"Different—but just as good."

"And that's what you think of me?"

She laughed. "Don't ask too much. You're just beginning to be yourself."

I made a funny face. "How did you find all this out?"

"Oh—Linda told me."

"What?"

"And Bernie, Jake, Morey, you, and everything around you."

"Spy!" I bit her bare stomach—gently, of course.

"By the way," she said after a while, "what are we going to do? Do you want to go out to Ceres, or Saturn? We've got to make plans."

"What do you think?"

"I like going where new things are being done," she said firmly.

"Same here," I replied.

The Sun lost its watercolor paleness as it brightened toward noon, and we walked back with its warmth on our faces.

21

Sunspacer

Sometimes I look toward Earth and see myself sitting in my high school cafeteria, gazing out through the 3-D motion mural at the parade of planets, imagining that I'm falling toward Saturn, into the rings of ice and debris—

—and I have to remind myself that I am out here, in the Rings of Saturn, helping to build a cluster of habitats; major centers are growing in orbit around the largest moons, which together with the rings are a plentiful source of raw materials. There are even plans for a tourist hotel.

If the Sun should suddenly expand into a red giant and gobble up the inner worlds of Mercury, Venus, Earth, and Mars, civilization out here would merely be warmed, we're so far away.

Bit by bit, humankind is shaping the resources of Sunspace into places for life. Millions of inner spaces will one day circle the Sun, forming at first a series of spaced rings, and finally a shell of life enclosing the Sun. The planets will be gone by then, used up for raw materials, but the place names and scenic locales will endure inside the habitats.

I have worked my way to the edge of a new life, but I will have to go the rest of the way to see it whole. Mistakes—my own and those of others—wait for me; but there is room for mistakes out here, where they can no longer cost the life of humanity's only home. Frontiers can absorb errors on a grand scale, you see; that was what was wrong with the rise of technical civilization on the surface of Earth. The vulnerability of an over-crowded, over-industrialized natural planet made human failure count for too much in the last century. Out here, we don't have to depend on people being perfect; our industrial and human wastes disappear into an ocean of night that can never be polluted. As it happens, we don't throw much of anything away; most of it goes into our fusion recyclers. Anyway, the point is that humanity is too widespread, too constructive, to ever be in danger of killing itself off again.

"Are you sure you want to go?" I asked Ro at the end of our Mercury contract.

"I want to work in strange places," she said with a straight face.

By the time we left, the habitat was working smoothly. There were a few problems with shielding, and a small fire in one of the hotel rooms gave us a scare on my birthday. The town lights had been a sprinkle of starlight on the lake that night, when a meteor had knocked out the external optics, throwing the hollow into darkness—but the towns simply kept their lights going until the Sun winked on again. Extra shielding on the outside rig was all that had been needed.

But the most important thing happened just as we were leaving. The big robots arrived and were sent down to Mercury. They would do *all* the heavy mining, refining, repairs, and launching of slugs. These were the most advanced machines, a thousand times better than the previous ones. Working through computer links, the miners would program these titans to go anywhere on the planet; human eyes would look over their shoulders, going where no human flesh, or previous robots, could survive. Fewer miners would be needed on the surface as time went on; fewer lives would be risked. I thought of the empty underground towns where we had almost lost our lives. Old Merk would finally get its way, and one day the warrens would be destroyed.

Bob Svoboda became a programmer-operator, working with the robot titans and the Brain-Core

intelligences. He married Helen Wodka a year after we left.

We ran into quite a few people from the Mercury project around Saturn, Jake and Linda among them. Both are interested in the same project Ro and I have applied for—as hands on the expedition to Titan's north pole. A large amphibious crawler-submarine will be placed on the surface, if possible, and it will try to reach the pole, by submerging if necessary. The training will be invaluable, and the experience might help us get on one of the big habitat starships now under construction around Titan.

It's awesome here in the Rings. The big planet's beauty creeps up on you, no matter how long you've been here. The planet seems nearby, floating casually, except something that big can't really be casual. In my sleep I sink through its mysterious ocean of gas and liquid, feeling with my feet for a bottom which may or may not be there, thousands of miles below ...

A dozen habitats are nearing completion around Titan alone. Ro and I learned today that the Centauri Starship's crew will be chosen from those of us who go on the polar jaunt. It's the only way of having a chance at the starship.

Where is home?

All of Sunspace is home. Those of us who work outside Earth's planetary womb are the eyes, ears, and hands of humanity, reaching out to the stars. Our Sun is only a common star, but the starlight sings eternal across the Milky Way, which is only one of the countless galaxies fleeing toward the edge of space-time. To go out among them, you have to keep changing; you have to burn inside, to hold back the dark; you have to want the vastness that is so full of possibilities, and know that it is a place of infinite beauty in which to test human courage and intelligence; you must feel deep space opening up in your heart, drink the strange light that flows into your eyes from far stars, and love the singing silence in your ears.

You have to care a lot.

[Go to Table of Contents](#) |

Book 2

The Stars will Speak

1

Lissa liked to listen.

Not only when people spoke to her, but when they talked to each other. She overheard conversations and tried to figure out who the people were, what they did, and what they were like from what they said. People didn't really know how much they showed about themselves when they spoke. Smiling, seemingly friendly people sometimes hid mean streaks in their words. Glum people, who appeared uncaring and thoughtless, were caring and thoughtful underneath. Lissa was always looking to catch people at being their true selves, but only her father seemed to be completely himself inside as well as outside.

"It only seems that way to you," he had often told her, "because you don't know the individuals. So when you hear them, you're really only imagining what they're like inside. If you heard them at different times, you'd get different impressions. It all depends on where you start."

"But that's just not true," she had insisted. "Some people are the same no matter how often you listen to

them. You're always the same. Inside, I mean."

"Some people is not everyone," he had said, smiling.

At the age of ten she had found out that scientists were listening to signals from an alien civilization somewhere among the stars—and she knew immediately that she wanted to help decode the messages. She had been only a year old when the signals had started coming in; by the time she was halfway through high school, she knew that she had to learn what they were saying.

It had seemed to her, at first, that it would be similar to what she had done when she had learned to read. Put the letters together into words, then make sentences out of the words—sentences stating things, describing, or commanding.

It wasn't that simple, of course. She knew that long before she sent her application to the Interstellar Institute, but she still felt that she could find out what was in the signals. She imagined herself making the breakthrough that no one, not even the best Artificial Intelligences, had been able to make.

"But what is it that makes you believe you can do better?" her father asked her, in as serious a tone as possible. He had learned long ago not to make fun of her ambition. "Besides, it's such specialized training. Don't you think you should have some normal college first, so your education won't be one-sided?"

He was one of the best physicists on Bernal One, as well as her father, so it seemed that he deserved to be answered carefully. "I feel sure that if I went through the training and could see the data, I'd have an idea about what the aliens are trying to tell us."

"You can't know that, Lissa," he replied gently.

"*I feel* it, and I'm willing to put it to the test."

He smiled. "I can almost believe you, but I guess you've got to learn for yourself if you're wrong."

"Right," she said proudly.

He looked worried. "And that may be all you'll find out—that you're wrong."

"But what if I'm right? Don't others my age apply for the schooling? Are they smarter than I am?"

He shook his head. "That's not the point. Look—that research hasn't gotten anywhere in nearly two decades."

"Why should that mean anything?" Lissa demanded. "Have you figured out all the physics you want?"

"No, of course not, but I have results."

"Some things are naturally harder. You admit this is a hard field."

"Yes, but this one may be beyond all humanity, including the computer minds. It may be centuries before results are even possible."

"I just don't believe it," she said, afraid that he might be right. "Why should that be?"

She watched him get ready for a bigger answer. He closed his eyes halfway, leaned forward in his chair, and rubbed his chin. "Because the origins of the alien race that sent the signals are probably very different from ours. Their biology and psychology are probably incomprehensible."

She smiled at him. "Come on, Dad, you're not playing fair. That's not the only view there is of the problem. Besides, don't you think they might have tried to make the message understandable to a dumber species like us? Or maybe they're even like us. Maybe whole sectors of the galaxy are shot through with similar life-forms, all having a common type of origin. The really alien races probably wouldn't be sending us signals that we could make out as even being signals."

"That would all be nice, if it were true."

"Well, we won't settle this just by talking about it, Dad. I'll have to go and try to find out!"

He sighed. "I suppose there's no point in trying to stop you." He looked at her sadly with his steel-blue eyes. "I'll miss you. I guess I always thought you'd go to school here on Bernal One, but Earth is a big and very different place, and you should get to see it sooner or later. Getting your professional schooling there is as good as any way to do it."

"I know, Dad. I'm apprehensive about going away, but I'm not scared."

His eyebrows went up. "Oh, I'm sure you're not scared of anything."

"Do you have any ideas about why the signals won't decode?"

He leaned back. "Maybe they don't want us to catch on too quickly, so we can get used to the idea of their being out there...."

"That's not a new idea, either."

"Maybe they want us to travel halfway up the sky before we meet them."

"We've got a starship on the way to Alpha Centauri," she said.

"Maybe their signals are all that's left of them."

"That would be sad. But I have a feeling that this radio signal isn't their main communication. It's only a way of getting our attention."

"Now that sounds interesting!" Her father smiled and shifted in his recliner. "But why should you think that? There's no evidence for it at all."

"People can think of what's possible even if there's no evidence, can't they?"

"Sure—but it'll remain only a stab in the dark unless you come up with experimental evidence."

"I know that, Dad. But it's good to play with possibilities." She got up from her deck chair and went to the railing of their backyard terrace. As she looked out into the great hollow ball that was Bernal One, she noticed her mother motoring up the road from the medical center. "Here comes Mom, late as usual."

"Well, we had a chance to talk," her father said.

As she watched her mother's scooter make the turn near the house, Lissa wondered if she could ever match Dr. Sharon Quintana's dedication to work. Dad worked as hard, but it didn't seem to show. Maybe that was why Dr. Morey Green-Wolfe hadn't won the Nobel Prize for physics yet. Lissa turned away from the view of her world and gazed at her father. He was leaning back with his eyes closed, enjoying the sunlight from the rings that circled the north and south poles of the sphere.

"Mom won't like my going, will she?" Lissa asked.

"Oh, I don't know," her father replied without opening his eyes.

"You came here from Earth just to study physics, and you stayed," she said, knowing it was a useless comparison.

"Have you discussed it with Sharon?" Morey asked. Lissa swallowed and looked toward the equatorial lake that spilled a river around the world. "A little. Only when we've all been together. I don't really know what she thinks. She's never around long enough. You at least sit around here working in your head, and I can come talk to you."

The lake glistened beyond the outer circle of the University. She saw a pedal-glider come down into the water.

"Surgery is a demanding field, Lissa," her father said in a serious tone. "Surgeons need a lot of sleep to stay fresh. And remember that your mother also has to teach."

"She does too much."

"She started late, when you were five."

A boat picked up the pedal-glider pilot. "Well, it's not as if she's going to run out of time, Dad. She can practice well into her nineties."

He opened his eyes and sat up. "Not with all the youngsters coming up. They'll want their chance, and they're eager to compete for it. Your mother wants to do something that she can be proud of, and if that means working harder to beat out the up-and-coming competition, then so be it."

"Don't you want that too, Dad?"

He nodded. "I thought so a long time ago, and maybe I'll still get it. But it's getting harder. A thousand people have the very same bright ideas every year, and the Network informs them of the fact almost as soon as it happens. I've done a lot of work. My papers are often cited in the work of others. I can't really complain. Maybe somewhere in my work there's a breakthrough waiting for me."

"Do you really think there is?" Lissa asked, intrigued by the possibility. "Like what? What kind of thing would it be?"

Morey shrugged. "What would you like?"

"An interstellar space drive! Something that would take us across the galaxy in a month! We could go to Centauri and meet our own starship when it arrived."

He brushed back his short brown hair and looked at her carefully. "It's gotta be there, somewhere." He looked very boyish, she thought, admiring him. "Why don't you stay here, study physics at O'Neill College, and find out where I've hidden it?" He sat back again, smiling. "Here's Sharon."

"So what have you two been gabbing about?" her mother demanded as she came out on the terrace and sat down in a recliner. "Lissa, can you get me a drink?" She closed her eyes and leaned back, brushing her red hair out of her eyes. Lissa noticed that her beige coverall suit needed cleaning.

"The usual, Mom?" she asked softly, knowing that her mother was already asleep. She looked at her face for a moment, watching the tension drain away from around her mouth, to be replaced by a childlike pout. The fierce Dr. Quintana was gone, leaving only a mom named Sharon.

"Let's go fix dinner," Lissa whispered to her father.

They rolled dinner out onto the terrace. Dr. Quintana came back to life as the sun rings were fading into twilight.

"Ummmm," she said, sniffing. "Sweet and sour pork."

"It's on the table," Lissa said.

Her mother nodded and found her place. She sat down, sipped a drink, and started eating immediately, using chopsticks. "Ummm, this is great. You two are always so good to me. I'll have to do something special for you one day."

"Sharon, Lissa wants to study at the Interstellar Institute in the Himalayas," Morey said as he sat down. "I think we should talk about it."

"On Earth?" Sharon asked as Lissa sat down next to her. "I thought they were on Lunar Backside."

"They are, Mother, but the school is on Earth. There are branches and listening posts on the Moon and Mars."

Dr. Quintana looked at her carefully, chewing her food. "And this is what you really want to do?"

Lissa looked into her mother's green eyes and nodded solemnly. "I've been wanting to all my life."

Sharon smiled and took another bite of food. "And I thought you wanted to be a cook."

"Ha, ha, ha," Lissa replied.

"Well, that's it then, daughter. You'd better study up on goats and get ready for hard weather. They don't turn it on and off like here, you know."

"I know."

"Have you been accepted yet?" Sharon asked more seriously.

"She will be," Morey answered cheerfully. "Her grades are excellent, as you well know, and she wrote them a very pompous letter."

Lissa glared at him. "And what does that mean?"

"Only that they want to hear from people who seem sure of themselves."

"How many apply?" her mother asked.

"Fewer than fifty," Morey answered, "and there are openings for over a hundred. As long as she has the grades and shows ambition, they'll give her a try."

"Do you have to make it sound so awful?" Lissa demanded. "From what I know, very few people actually apply, and the Institute is picky besides."

"Darling daughter," her father said sternly, "it will be what you can make of it, and you know what I think."

"We wish you well, dear," her mother said, sipping some tea, "but we'll always be here when you need us."

Lissa tensed. "You could show more confidence in me."

"It's not you," Morey said, "it's the field of work. It could go on for centuries without results."

Lissa pulled back into herself. "I don't admit that. They're out there, talking to us, and we have to keep listening and trying to understand, because what they have to say may be the most important thing in all human history."

"Let's hope you're right," her mother said as her father sighed impatiently. "You've given up the usual amount of dating and socializing, and you're willing to go to Earth to study—not that it's a bad place, but people your age don't think it fashionable to go there. With all that and the dedicated interest you've shown, I think you deserve to do what you want."

"Thanks, Mom," Lissa said, pleased by the firmness of Sharon's support.

"Is there any more food?" her mother asked.

"I'll get you some," Lissa said.

The mail-alert was flashing on the screen when Lissa came into her room after dinner. She sat down at her desk and touched her thumb to the personal lock. The alert faded, and she saw that a communication had arrived from the Interstellar Institute. It was the formal letter of acceptance, together with some orientation material. She felt a thrill as the title of the brochure appeared over a picture of the Himalayan mountains:

THE INTERSTELLAR INSTITUTE

[ENTER YOUR PREFERENCE FOR VOICE NARRATION OR READING TEXT AND STUDY THIS MATERIAL CAREFULLY]

She chose to read, because reading always conveyed more than a voice- and-picture program, but she hoped there would be at least a few pictures.

Lissa read:

THE INSTITUTE IS LOCATED IN NEPAL, NEAR THE BORDER BETWEEN THAT LAND AND THE INDIAN STATE OF UTTAR PRADESH. HERE, AGAINST THE BACKDROP OF THE FABLED "ROOF OF THE WORLD," THE HIMALAYAN MOUNTAINS, STUDENTS FROM ALL PARTS OF SUNSPACE ARE TRAINED FOR THE IMPORTANT TASK OF INTERPRETING A MESSAGE FROM THE STARS.

THE INSTITUTE'S LOCATION AND GROUNDS WERE MADE POSSIBLE THROUGH THE GENEROSITY OF THE FAMILY OF ADRI SHASTRI, THE PROMINENT INDIAN SCIENTIST WHO FIRST PICKED UP THE ALIEN SIGNAL IN 2064. DR. SHASTRI'S FAMILY, WHO OWNED THE LAND AND BUILDINGS WHERE THE INSTITUTE IS SITUATED, CONTRIBUTED THESE HOLDINGS, AS WELL AS SOME OF THEIR WEALTH, FOR THE RESTORATION OF THE STRUCTURE, TOWARD THE FULFILLMENT OF THEIR SON'S DREAM—A SCHOOL WHERE THE UNUSUAL AND CREATIVE STUDENT COULD BE TRAINED IN WHATEVER KNOWLEDGE AND TECHNIQUES MIGHT BE NEEDED IN INTERPRETING THE ALIEN SIGNAL. IT IS HOPED THAT A STUDENT TRAINED HERE MIGHT BE THE ONE WHO WILL ONE DAY REVEAL THE MESSAGE OF THE STARS TO ALL HUMANITY.

THE INSTITUTE ITSELF IS HOUSED IN A STRUCTURE ONCE USED AS A MONASTERY.

IT IS PERHAPS APPROPRIATE THAT, IN THIS MOUNTAINOUS, ISOLATED SPOT, WHERE A COMMUNITY OF MONKS ONCE PONDERED THE REALMS OF THE SPIRIT, STUDENTS NOW PONDER A MYSTERY AS DEEP—A SIGNAL FROM AN ALIEN CIVILIZATION.

STUDENTS ARE HOUSED IN THE MONASTERY ITSELF; AND IN AN INSTALLATION DEEP WITHIN THE MOUNTAIN UPON WHICH THE MONASTERY RESTS, STUDENTS, TECHNICIANS, AND VISITING SCIENTISTS MAY COME TO VIEW THE ALIEN SIGNAL.

THE NEAREST VILLAGE IS IN THE VALLEY BELOW THE INSTITUTE. IT IS INHABITED BY BOTH CITIZENS OF NEPAL AND A FEW PEOPLE FROM OTHER PARTS OF THE WORLD, MOST OF WHOM PURSUE A SIMPLER FORM OF LIFE AS FORESTERS AND HERDSPEOPLE. THE VILLAGE CAN BE REACHED BY FOOT OR ON HORSEBACK. STUDENTS MAY, DURING FREE MOMENTS, ARRANGE FOR TRANSPORTATION TO THE NEPALESE CAPITOL OF KATMANDU, BUT SHOULD BE AWARE THAT THE NEPAL OF INTERNATIONAL AND INTERPLANETARY TRAVELERS IS NOT WHAT THEY WILL FIND IN THIS SUBDUED SETTING OF MOUNTAINS AND FORESTS. STUDENTS ARE EXPECTED TO CONDUCT THEMSELVES WITH RESTRAINT IN THE VILLAGE, AND TO TREAT ITS PEOPLE WITH COURTESY SHOULD THEY CHOOSE TO SPEND TIME THERE. THESE PEOPLE LEAD LIVES QUITE DIFFERENT FROM THOSE MOST STUDENTS HAVE PURSUED, AND TEND, QUITE UNDERSTANDABLY, TO REGARD THE INSTITUTE WITH SOME AMUSEMENT.

UNLIKE OTHER UNIVERSITIES AND INSTITUTIONS OF HIGHER LEARNING, THE INSTITUTE SELECTS A GROUP OF STUDENTS ONLY ONCE EVERY THREE YEARS. THIS IS SO THAT EACH GROUP CAN START FRESH AND FIND ITS OWN WAY WITHOUT THE INTERVENTION AND GUIDANCE OF OLDER AND MORE EXPERIENCED STUDENTS. AT THE END OF EACH THREE-YEAR PERIOD, A NEW GROUP WILL BE CHOSEN. ALTHOUGH THERE ARE PLACES FOR AS MANY AS ONE HUNDRED STUDENTS AT A TIME, THE INSTITUTE WILL TAKE ONLY AS MANY STUDENTS AS IT FEELS ARE QUALIFIED. APPLICANTS SHOULD BE AWARE THAT THE STANDARDS ARE AS HIGH AS AT MOST SELECTIVE SCHOOLS, AND THAT ACADEMIC ABILITY ALONE WILL NOT ENSURE THAT AN APPLICATION WILL BE ACCEPTED. A GROUP OF STUDENTS MAY NUMBER AS MANY AS A HUNDRED, OR AS FEW AS FIVE. EACH APPLICANT IS EXPECTED TO SUBMIT THE FOLLOWING:

- 1) A RECORD OF GRADES AND ACCOMPLISHMENTS AT ANY SCHOOL HE OR SHE HAS ATTENDED.
- 2) A PSYCHOLOGICAL PROFILE.
- 3) A RECORD OF HEALTH.
- 4) AN EMPLOYMENT RECORD, IF ANY, ALONG WITH A BRIEF ESSAY ABOUT WHY THE JOB WAS TAKEN.
- 5) TWO LETTERS OF RECOMMENDATION. THESE MAY BE SUBMITTED BY TEACHERS, EMPLOYERS, OR ANY ADULT NOT RELATED TO THE APPLICANT WITH WHOM THE APPLICANT HAS HAD PROLONGED CONTACT, OR ANY PERSON OF HIGH ACHIEVEMENT WHO MAY OR MAY NOT BE AN ADULT. WHEN REQUESTING SUCH LETTERS, APPLICANTS SHOULD POINT OUT THAT THE INSTITUTE IS INTERESTED IN IMPRESSIONS OF AND FEELINGS ABOUT THE APPLICANT, AS WELL AS IN HOW THE

APPLICANT HAS PERFORMED IN THE PAST. CAREFUL THOUGHT SHOULD BE GIVEN AS TO WHOM ONE SELECTS TO WRITE SUCH LETTERS; THAT CAN BE AS IMPORTANT AS WHAT IS STATED IN THE LETTER ITSELF.

6) A WRITTEN ESSAY ABOUT THE APPLICANT'S REASONS FOR WISHING TO ATTEND THE INSTITUTE.

7) A RECORDING OF THE APPLICANT'S IMAGE AND VOICE, IN WHICH THE PROSPECTIVE STUDENT RELATES THE MOST SIGNIFICANT OR FORMATIVE EXPERIENCES IN HIS OR HER LIFE. THIS RECORDING, LIKE THE ESSAY, MAY BE AS LONG OR SHORT AS THE APPLICANT FEELS IS NECESSARY. IF THE APPLICANT CANNOT AFFORD TO SUBMIT SUCH A RECORDING OR HAS NO ACCESS TO SUCH EQUIPMENT AS MAY BE NECESSARY, HE OR SHE MAY SUBMIT A REQUEST IN WRITING FOR EXEMPTION FROM THIS REQUIREMENT. SHOULD THE INSTITUTE FEEL THAT THE APPLICANT SHOWS PROMISE, AN INTERVIEWER WILL ARRANGE TO VISIT THE APPLICANT IN HIS OR HER HOME OR A PLACE NEAR IT.

8) ANYTHING ELSE THAT MAY GIVE THE INSTITUTE A PICTURE OF THE APPLICANT. THIS INCLUDES RECORDS OF ANY HONORS GIVEN, A PIECE OF ARTWORK OR A SCIENTIFIC EXPERIMENT DONE BY THE APPLICANT, A POEM OR A WORK OF FICTION, RECORDS OF ATHLETIC ACCOMPLISHMENT, OR AN ESSAY ABOUT HOBBIES AND SPECIAL INTERESTS.

PROSPECTIVE STUDENTS ARE ADVISED *NOT* TO VISIT THE INSTITUTE, EVEN IF SUCH A VISIT IS FEASIBLE. THE ABILITY OF A STUDENT TO ADAPT TO A NEW AND STRANGE ENVIRONMENT IS AN IMPORTANT REQUIREMENT OF THE INSTITUTE'S PROGRAM.

[SPECIAL NOTE: IF YOU HAVE BEEN ACCEPTED WITHOUT FULFILLING ALL THE ABOVE REQUIREMENTS, PLEASE SUPPLY THE MISSING ITEMS AS SOON AS POSSIBLE]

APPLICANTS SHOULD BEAR IN MIND THAT THE INSTITUTE'S PROGRAM DIFFERS FROM THE MORE FORMAL AND STRUCTURED COURSES OF STUDY IN OTHER CENTERS OF HIGHER LEARNING. MUCH OF WHAT IS LEARNED WILL BE DETERMINED BY THE STUDENT, WHO WILL BE ENCOURAGED TO EXPLORE MANY AREAS.

EACH STUDENT WILL BE GIVEN A PERSONAL AI [ARTIFICIAL INTELLIGENCE] AND, WITH THE AID OF THIS ENTITY, WILL PURSUE VARIOUS SUBJECTS. THE AI OR A VISITING SCIENTIST MAY OCCASIONALLY SUGGEST AN ASSIGNMENT. TUTORIALS AND SEMINARS WILL BE HELD AT INTERVALS WITH DR. SHASTRI OR ONE OF HIS ASSOCIATES, AND STUDENTS ARE ENCOURAGED TO REQUEST SUCH TUTORIALS AT ANY TIME WHEN THEY FEEL THEY WANT TO PURSUE A SPECIAL LINE OF INQUIRY. STUDENTS WILL ALSO BE EXPECTED TO SPEND TIME EXAMINING THE ALIEN SIGNAL DIRECTLY. AS THE STUDENT PROGRESSES, IT WILL BE NATURAL THAT HE OR SHE WILL CHOOSE TO WORK ON SOME SUBJECTS TO THE EXCLUSION OF OTHERS. AT THE END OF THE FIRST YEAR, EACH STUDENT WILL CONFER WITH DR. SHASTRI AND REACH AN ASSESSMENT OF THE STUDENT'S PROGRESS. EACH STUDENT WILL BE EXPECTED TO PRODUCE A TENTATIVE PLAN FOR HIS OR HER FUTURE STUDIES AND THE REASONS FOR CHOOSING SUCH A COURSE.

NO GRADES ARE GIVEN AT THE INSTITUTE. ABOUT EVERY THREE MONTHS, THE

STUDENT WILL RECEIVE A WRITTEN EVALUATION BY DR. SHASTRI OR ONE OF HIS ASSOCIATES. ALTHOUGH MOST STUDENTS COMPLETE THEIR THREE-YEAR COURSE OF STUDY AT THE HIMALAYAN CENTER, OCCASIONALLY ONE MAY BE GIVEN A CHANCE TO LEAVE BEFORE THAT TIME FOR ONE OF THE INSTITUTE'S OTHER BRANCHES IN SUNSPACE, WHERE STUDENTS WILL STILL BE EXPECTED TO CONTINUE THEIR STUDIES.

UNLIKE MORE CONVENTIONAL UNIVERSITIES, THE INSTITUTE ARRANGES NO CLUB MEETINGS, SOCIAL EVENTS, TEAM SPORTS, OR ASSOCIATIONS. STUDENTS ARE FREE TO FORM SUCH CLUBS OR GROUPS THEMSELVES AND TO ARRANGE FOR THEIR OWN SOCIAL LIVES, IF THEY SO CHOOSE. VISITING RESEARCHERS AND SCHOLARS WILL ARRANGE FOR SEMINARS AND MAY BE INVITED TO ANY SOCIAL FUNCTION PLANNED BY STUDENTS. MOST STUDENTS HAVE FOUND THAT THE DEMANDS OF THEIR WORK DO NOT ALLOW FOR AN ACTIVE SOCIAL LIFE, AND THE ISOLATED SETTING DOES NOT OFFER MANY OPPORTUNITIES FOR SOCIALIZING. PROSPECTIVE STUDENTS SEEKING A VARIED SOCIAL LIFE ARE ADVISED TO LOOK ELSEWHERE. MAVERICKS WHO CAN RELY ON THEIR OWN MENTAL RESOURCES AND CAN SEEK THEIR OWN AMUSEMENTS WITHOUT THE SUPERVISION AND GUIDANCE OF OTHERS MAY FIND THE INSTITUTE A CONGENIAL PLACE.

BECAUSE THE INSTITUTE HAS NO FORMAL COURSE OF STUDY AND NO SET REQUIREMENTS, STUDENTS ARE GRANTED DEGREES WHEN, IN THE INSTITUTE'S JUDGMENT, THEY HAVE MET THE HIGHEST STANDARDS FOR SUCH A DEGREE. A FEW STUDENTS HAVE ALREADY ACHIEVED ONE OR TWO DOCTORATES AT THE END OF THEIR COURSE OF STUDIES, WHILE OTHERS LEAVE WITH A BACCALAUREATE ONLY. EACH STUDENT IS EXPECTED TO SET HIS OR HER OWN PACE, WHILE KEEPING THE INSTITUTE'S PURPOSE—THE BREAKING OF THE ALIEN SIGNAL—FIRMLY IN MIND. INSTITUTE STUDENTS LIVE FOR THE FULFILLMENT OF THIS HIGHEST AMBITION.

ALL STUDENTS CAN BE ASSURED THAT THEY WILL RECEIVE AN EDUCATION EQUAL TO ANY IN SUNSPACE. THOUGH FEW CHOOSE TO LEAVE THE INSTITUTE FOR ANOTHER SCHOOL BEFORE COMPLETING THEIR THREE YEARS, THOSE WHO HAVE DONE SO FIND THAT THEY ARE EASILY ADMITTED TO EVEN THE MOST SELECTIVE SCHOOLS, PASSING RIGOROUS ORAL AND WRITTEN EXAMINATIONS. MANY OF THE INSTITUTE'S GRADUATES HAVE FOUND A RICH AND INTELLECTUALLY REWARDING LIFE IN ITS OTHER BRANCHES, WHERE THEY CONTINUE TO CONTRIBUTE TO THE DIFFICULT MULTIGENERATIONAL JOB OF SOLVING THE MOST PROFOUND MYSTERY EVER PRESENTED TO OUR SPECIES.

The brochure ended. It still sounded a bit pompous to her, but she again felt the thrill of possible accomplishment in confronting the unknown and unmasking it. Her own written essay had probably sounded just as pompous.

She turned off the screen. It was almost time for sleep, and she still had to shower.

[|Go to Table of Contents |](#)

2

The graduation ceremony took place on the lawn behind the Riverbend High School gym. A hundred students, their parents, and a band turned out at 10:00 A.M., June 1, 2080. Mr. J. W. Molly, the

Principal, gave a short speech about city-states in history, drawing obvious parallels with the Free Space Settlements throughout Sunspace. He reminded his audience that Sunspace included all the inhabited worlds of the Solar System—the natural planets; the artificial habitats in the Asteroids and around Jupiter and Saturn; the industrial community around Mercury; the domed cities on Mars and Venus; the Lunar Settlements; and, technically speaking, even Earth itself. Bernal One had been one of the earliest space colonies to be built in the Moon's Orbit, he pointed out, and was nearly as old as the century. A number of the other habitats in the Bernal Clusters of L-4 and L-5 were almost fifty years old. Ten new O'Neill Cylinders were under construction in Solar orbit. No one would ever run out of room out here, since new worlds could be built as population increased. Total population beyond Earth was well over 10 million and growing, and 3 million were right here at L-5 ...

Lissa sat in the first row, waiting impatiently for the diplomas to be handed out. She looked up at the giant triangle of Skytown, ten kilometers across from Riverbend on the inner equator of the hollow sphere that was Bernal One. There was a graduation ceremony going on there also. Most of the college-bound graduates were going to Dandridge Cole University, or to one of the technical colleges on Luna. She was the only one she knew who was going to Earth.

"I'll also be going to Lunar Backside," she explained defensively during the reception that followed the ceremony, "as soon as I'm done with my preliminary studies on Earth. The Institute has branches all over Sunspace, you know." Elena Tomasino, her physics lab partner, smiled politely and wished her luck, obviously not caring much about whether it was true. Earth just didn't have much of a reputation as a place to live. Sunspacers liked the idea of visiting, but they kept in mind the fact that this was a world that killed more than half a million people a year with natural disasters, accidents, and crime. Sunspacers were used to clean, orderly environments that they could control to a high degree, and that was just not possible on a natural world.

As her class milled around on the lawn, Lissa sat down in an empty chair, feeling guilty about Henry Baum. He just didn't attract her, even if she hadn't been going away. She spotted him with his parents in the crowd, but he looked away from her.

"Why do you want to go to Earth?" he had asked her a week ago. He was the closest to a boyfriend she had ever had, or had permitted herself to have, and she had realized suddenly that he was really upset about her going away. "My dad says Earth's crowded and smelly, and it has weird diseases that resist treatment."

"Do you really believe that?"

"Everyone knows that, Lissa. I mean, there's ten billion people down there!" He was studying to be an industrial chemist.

"I've got to go," she had answered. "The Institute's school is there."

He had touched her hand gently across the lunch room table. "I'll miss you." He had looked at her with his gray eyes, and she had admired his long lashes. Some of his pudginess seemed to have disappeared, she had noticed, surprised at how much he seemed to care about her.

She gazed up into the great lighted space and imagined the habitat's people suddenly drifting free of the inner surface, out into the sunny emptiness, if Bernal were to stop turning. The centrifugal spin that pressed everything to the inner surface here was nothing more than the acceleration that kept water at the bottom of a bucket whipping around at the end of a rope. On Earth she would experience a gravitational field for the first time, the actual attraction of a large mass, not the steady acceleration of spin. She wouldn't feel much difference, of course, except that it would be a full one gravity, slightly higher than the

force on Bernal. She thought of the people who had grown up on Mars, the Moon, or on Mercury, where gravity was less than twenty percent of Earth's. Those people would never be able to live on Earth. They could visit in wheelchairs, or stand with the help of external prosthetic supports, but never comfortably, she knew. Entire generations of colonists were forever cut off from the home world; but they were at home elsewhere.

She looked around for her father, and saw him talking to Mr. Molly. And she knew suddenly that she was really leaving, and that she would miss this inner world of small towns and parks, gentle sunlight and small streams. Bernal's perfection was a human order, made by and for humanity—not the nature of a teeming planet like Earth, or the harsh, radiation-filled openness of Sunspace, but that of a newly made place....

"What can I say, Lissa?" her father asked as he sat down next to her. "We both know that high school is nothing at all. You learned most of what they could teach you halfway through. You got to do a lot of interesting reading." He smiled as he leaned over and kissed her on the cheek. "Sharon's very sorry she couldn't come, but a life depended on a major piece of surgery they could not do without her." He smiled. "Well, they could have, but it was a new technique that she helped develop, so she had to be there to see it work."

"I really don't mind," Lissa said, smiling gently and feeling something of her father's expression in her own face. Things were changing for her quickly now. She felt sad and hopeful at the same time.

Three bottles of champagne were waiting for them on the terrace. Mom sprang at her from behind the door and poured a small bottle all over her head. "Congratulations, dear!" she cried. Dad went over to the bucket and moved the bottles around in the ice.

Lissa's head was spinning by early evening. The sun rings faded to moonlight, and the lights went on all over the inner surface. She sat and watched the road lamps connect the towns. The great lake sparkled, and she knew again how much she would miss home.

But in the back of her mind she heard the alien signals singing a strange song that called to her. She felt her ambition; it demanded that she do whatever was needed to bring out her best. Earth wasn't so far away; she'd be back for holidays. Her father had grown up on Earth, so it couldn't be that bad.

"You'll like it," he said, catching her mood. "It was home to me before I came to college on Bernal. I had to come, because it was the best place for physics. My roommate, Joe Sorby, and I knew that, and it's the same with you." He toasted her with an empty glass, and she felt his sudden sadness.

She would have to go to the polar spaceport alone the next morning, but she didn't mind. Mom had to see a patient very early, and Morey would still be asleep. Lissa didn't want him to miss his one o'clock class. He needed a lot of sleep in order to shovel physics into new brains.

"Are you sure you can handle being away in a strange place?" he asked, shifting in his recliner. There was only a trace of doubt in his voice.

"Of course I can," she answered firmly, yet felt that her life so far had rushed by too quickly.

"Oh, there was a message for you from Henry earlier. He didn't want to stay on or have me call you. He just said to tell you good luck."

"Thanks."

Her father was silent, and after a few moments she noticed that he had fallen asleep. She smiled, feeling

that he had accepted her plans for the future, however critical he might be of the Interstellar Institute's work. As she gazed at his sleeping face, she realized how important the approval of her parents was to her sense of determination.

[Go to Table of Contents](#) |

3

The Pacific Ocean was in full view as Lissa awoke aboard the shuttle to Earth. India and the island of Sri Lanka were an intricate pattern of greens and browns. In the north, the Himalayan mountains looked like plowed furrows on the border of Tibet. She had seen all this before, through the large telescopes on Bernal One; but now, during the twenty-four-hour journey from L-5 in the Moon's Orbit, she had time to realize that she would be living in those furrows. The Earth would grow large and she would become small; the planet would become a whole world, millions of times larger than the 314 square kilometers that made up the inner surface of Bernal's hollow ball. On Earth that was just enough for a good-sized city. Gravity would not be the centrifugal pressure of rotation, but an even force that would not vary from the equator to the poles, as it did back home. There would be no zero-g areas. Days and nights would be slightly irregular, and the weather would be only partially controllable or predictable. Mr. Thomaso, her high school adviser, had warned her to expect a somewhat messy environment; it was just not possible to keep a huge planet as clean and tidy as a small space colony.

The Earth now took up nearly half the small 3-D screen in her passenger compartment. She shifted against her restraining straps and stretched. Her stomach had felt queasy in prolonged zero-g, but that had disappeared in the first few hours.

Most of the other passengers along the central passage of the shuttle were older people—business persons and officials of one kind or another. She was the only student going to Earth on this run.

The planet grew larger on the screen. Soon the Pacific would take up the whole view. The shuttle was coming in directly to the Earthport at Woomera, Australia.

Mike, the steward, drifted by her compartment and made sure she was wearing her restraints. The breakfast light was still on over her personal console. She pushed the button and flushed the food away; it was better not to eat too much during zero-g trips, and she wasn't very hungry anyway, still feeling her disappointment at the food she'd found when she had slid open the small door for dinner.

Reaching over, she unhooked the observation helmet and put it on. At once it seemed that she was floating free in space. Earth was a great ball of brightness below her, its atmosphere a lens magnifying oceans and land masses. The poles were bright caps of snow. Night had just fallen on the West Coast of the Americas. Cities winked on as the line of darkness overtook them.

The shuttle turned around on its gyros, and she saw the Moon, now more distant than she had ever seen it. Her father had taken her to Luna City twice in her first year of high school. What she remembered best was the slow, graceful descent of the shuttle onto the airless walled plain of Plato. Landing on Earth would be very different.

She took off the helmet, attached it to its hook, and relaxed. Pressure pushed her down into her couch as the shuttle fired its engines to slow down, coming in toward Woomera tail first. The weight in her stomach felt good, and she looked forward to eating a large meal.

The view on the 3-D screen changed to landside cameras. She was suddenly looking up into Earth's sky, searching for her shuttle among the clouds.

Deceleration remained comfortably steady, and finally she saw her shuttle drop through the clouds into scattered sunlight. The view changed as she heard the sonic boom, showing the landing field from the ground. Atomic engines running steadily, the giant bullet shape came in and touched the desert.

I'm here, on Earth, Lissa thought excitedly, on the planet where humanity had been born. Her father was from New York City. Her mother had been born on Bernal, but her family had come from Ireland and Spain.

"Woomera Earthport," the Captain announced over the intercom. "Prepare to disembark."

What a nice old word, she thought. To get out of the bark, or boat, to disembark. She took her handbag of personal gear out of its niche and waited for the shuttle's core elevator to stop at her cubicle. It went down once in the passageway, then came back empty and stopped for her. She got in carefully, testing her legs in real gravity.

The lift made its way down the shuttle, picking up passengers. When it had collected twenty people, it went all the way down.

The outer door opened. Lissa stepped out through the open locks into a long tunnel. She walked straight ahead, following the flashing lights, taking careful steps, carrying her bag by its shoulder strap. There seemed to be no difference walking in real gravity, and she didn't feel particularly heavier.

"First trip to Earth?" a male voice asked from her right. She turned and saw a young man walking next to her, carrying what seemed to be a heavy suitcase. He was smiling at her strangely, and she didn't like it.

"How can you tell?" she replied, looking ahead.

"Offworlders always have that ballet walk when they arrive," he said in a resonant tenor voice.

"Really?" she asked skeptically, and kept walking, trying to ignore him.

"Don't get me wrong, you're very elegant at it."

She stopped and looked at him. He was slightly taller than she was, somewhat stocky, with sandy blond hair and deep blue eyes, and he was still smiling at her like an idiot.

"Who are you to talk?" she demanded without thinking. "Didn't you come in from somewhere off-planet on my shuttle?"

"Oh, no, no, I'm not one of you," he said. "I'm just coming back from a college interview on Bernal One. I didn't like it all that much, even though my dad wanted me to go there. I went to the interview just to satisfy him, I guess. He thought I'd change my mind and head out there next year."

Lissa started walking again. "And what's wrong with schooling there? Dandridge Cole is one of the finest universities in Sunspace."

"Right, one of the top three, but not for what I want. Besides, I found Bernal rather small and cramped."

"Small?" She stopped and glared at him for a moment. "Where are you from?" she asked, then resumed her pace.

"My name's Alek Calder. I'm from Sydney."

Lissa stumbled, and he caught her by the arm. She pulled away and kept walking.

"No offense meant," he said, keeping up. "I just didn't feel very well on Bernal. I'm probably one who takes getting used to spin-g, so it's just as well."

She kept walking, sure that he was lying to get her sympathy.

They came out inside a large dome filled with hurrying people. Daylight illuminated the vast inner space. Lissa noticed that Gate Five, where she would make her connection with the atmospheric jet for India, was on the other side of the dome.

She hung her small bag on her shoulder and stared across the great floor. After a few moments she glanced back. Alek Calder was following her. She stopped, turned around, and glared at him again.

"It's not enough that you're a bit obnoxious," she said, "but do you also have to follow me?"

He grinned as he put down his heavy suitcase. "Don't flatter yourself. I'm also going to Gate Five. That is where you're going?"

"What? Oh." Lissa felt suddenly embarrassed. "I'm sorry," she managed to say.

"That's all right," he replied, smiling appealingly. "Say, where are you going?"

"India," she said.

"So am I, but where in India? It's a big place."

"I'm going to study at the Interstellar Institute," she said, trying to put some pride into her words.

He grabbed his suitcase and moved toward her suddenly. "So am I!"

"Just my luck," she whispered, retreating a few steps. But he couldn't be a complete fool if he was going there, she thought in the back of her mind. He wasn't all that bad-looking, she noticed; if only he weren't so loud and pushy.

"What's your name?" he asked.

She hesitated. "Lissa Quintana-Green-Wolfe," she said finally.

"Hello, Lis."

"It's Lissa and nothing else."

He shrugged. "Okay, Lissa."

"We'd better keep moving," she said, turning away.

He hurried to keep up with her. They came to Gate Five and went through into another long tunnel.

"What will you be doing at the Institute?" she asked, unable to accept him as any kind of dedicated student. Maybe he was going to be a janitor, or a technician of some sort. She felt a bit guilty for thinking of him so harshly.

"Well," he replied, "I guess I'm to try to ferret out what the blokes out there are saying to us, if anything."

Her disdain increased. That was her dream, her hope; he had no right to it, with such a careless attitude. But there would be other students with her interests at the Institute, she reminded herself. Alek wouldn't be the only one.

"Can I carry your bag for you?" he asked softly, matching her step for step. "You look a bit peaked."

"Yours looks heavy enough," she replied. "I'd carry it for you if I liked you."

He laughed. "You don't have the muscle for this one."

She stopped. "Give me that!" She wrenched the case from his hand and marched away, hating herself for doing it; but his boorishness had made her angry.

The case grew very heavy. She carried it for a dozen meters, and then, feeling foolish, set it down as gracefully as she could without looking winded.

"I'm sorry," Alek said as he caught up with her. "I was about to say how overpacked it was."

She stared at him in silence.

"I'm really sorry," he repeated.

She took a deep breath and adjusted the shoulder strap on her bag.

"Okay, you did well," he added.

"That's no good either," she said, restraining a smile.

"I know," he answered, looking lost. He showed her his own reddened hands. "I tried to warn you how heavy it was."

"Why did you try to get me mad?" she asked, watching his face carefully.

He grimaced. "Because you did the same." He smiled. "Look, forget all that. Let's be friends, okay?"

Lissa remained silent, resisting his show of friendliness.

"Okay, you can punch me," he said finally, still smiling

She made a fist and bumped him gently in the belly.

[|Go to Table of Contents |](#)

4

The small jet whisked them north to the border of Nepal, and left them on a windy strip of concrete. The terminal was small but modern—a two-story cube tower combination with a comfortable waiting area that was easily entered through weather-sealed automatic doors.

"I guess we're the only ones going this way today," Alek said as they watched the jet take off for its return flight. He turned away from the large picture window and sat down next to Lissa on the cushioned bench.

She smiled. After talking with him during the flight, she had concluded that he wasn't such a rude person, only nervous and shy, which made him speak without thinking. It only occurred to her vaguely that she made him nervous.

Alek got up again and began to pace the deserted waiting area.

"What's the matter?" she asked.

He stopped and looked at her carefully. "Nervous, I guess. Aren't you uneasy?"

"A little, I suppose," she said, turning away from his gaze to the picture window. The Himalayas sat icily on the horizon, superhuman masses asleep under a bright-blue sky. She knew they were very old, unlike the landscaping of Bernal One. They were at least a hundred kilometers away, but it seemed that she could go outside and walk over to them in a few minutes.

"Why is the Institute here?" Alek asked. "Why is any part of it here?" He sat down next to her again. "Don't you feel that maybe this place isn't going to be what you thought?"

She turned and looked at him. "Didn't you read up on the history of the place before you applied?" He was still watching her intently.

"Not much, only about what it does," he said with a self-deprecating shrug.

"Well," Lissa began, "the Indian scientist Adri Shastri, who first picked up the alien signals, came from a wealthy family. They owned an ancient monastery and some hillside land above a river, so they made it a center for his research." She turned and looked out the window again. His gaze was making her uneasy.

"What is it?" he asked with concern.

"It's so beautiful here, and so big. The Earth seems too big!" She looked back to him. He was watching her thoughtfully, and she wondered how she could have disliked him so much only a few hours ago.

He smiled. "Did you think the Earth was small?"

"I'm not used to planets. Bernal seems just the right size to me. You could get lost on Earth."

"You'll get used to it." He touched her hand, and she felt silly, weak, angry at herself.

"I'll be okay," she said, taking her hand away, puzzled by her feelings. Maybe Alek was right. The Institute might not be what she had imagined. Perhaps it was the reality of being among others who would be listening to the alien signals that was making her uneasy; it meant that she wasn't very special and would have to compete and share her interests. Suddenly she didn't like her own thoughts. She was going to a wonderful place, she reminded herself, in order to prepare for fascinating work.

"What's the matter?" Alek asked.

She looked at him, dismissing her doubts. "Just a bit disoriented by the trip, I think."

"So am I, a little. Let's hope we like the place when we get there."

"I'm sure we will," she said firmly.

He got up. "Here comes the airbus."

She looked out the window and saw a large copter approaching from the north. It came in fast, hovered, and seemed to set down hard on the concrete.

"It's an Australian air truck," Alek said. "Pulse nuke engine, with enough power to maneuver and land in high winds. Just the thing around here, I'd say. My dad builds the engines for them."

Lissa got up and adjusted her shoulder bag. Alek picked up his suitcase. They went out through the

automatic door and hurried across the field. The wind seemed colder, despite the bright afternoon sunlight. Lissa squinted and kept up with Alek's stride, determined not to show any more uncertainty. It was only the awesome strangeness of Earth that had shaken her up, nothing more.

In the forested foothills, the copter found a river and followed it upstream. Lissa gazed down at the winding silver-blue ribbon of water, then looked up at the bare peaks standing like aged parents over the green hills. The copter shot over several villages, then left the river and continued north.

"There it is," Alek said.

She looked ahead through the observation bubble and recognized the monastery. It sat atop a high, stony hill, looking as if the rock itself had been carved into a large, single structure. The tiled roof was angled low, to keep the wind from tearing it off. As the copter came closer, she saw various antennae and satellite reception dishes, and the sight made her feel calmer; they were familiar things.

"Big place," Alek said, "plenty of dorm space." She liked the sound of his voice when he spoke softly.

The copter came in over the central courtyard and eased down onto the gray paving stones. The big blades slowed and finally stopped.

"You may get out," the pilot said over the intercom. "I have to hurry to pick up some supplies."

The door to the lower passenger cabin slid open. A white-haired man stuck his head inside, looked up, and smiled as Lissa stepped down from the observation deck.

"Oh, my goodness!" he shouted. "There should have been five of you. What have they done with them?"

"We're the only ones," Alek said.

"No one else?" the man asked, climbing in. He was an old Indian gentleman, with leathery skin, white hair, and graceful movements. "You're very certain?" He kept looking around the lower cabin as if the three students might be hiding under the seats.

"We're very sure, Dr. Shastri," Alek said, stepping down next to Lissa.

She took a deep breath. Of course. He was younger in the pictures she had seen. And she had almost taken him for a silly administrator.

"I've got to go," the pilot repeated over the com.

Dr. Shastri turned and jumped down to the court yard. Lissa followed. Alek came down carefully next to her, lugging his heavy case.

Lissa shivered. The wind seemed even colder here.

"We're very warm inside," Dr. Shastri said, noting her discomfort. "Australian mini-nuke heat-exchanger furnace. Very reliable."

Lissa smiled at him, thinking how strange it was to have no control over outdoor temperatures. Of course, she realized, there was no outside on Bernal. Everything was inside.

Dr. Shastri led them across the courtyard to a large door. The copter took off behind them, increasing the wind-chill for a moment.

Dr. Shastri opened the big wooden door, and they followed him inside. He might have taken them

through a magic portal, Lissa thought, from the past into the future, because suddenly they were in a modern hallway. The ceiling flowed with white light, reflecting in the polished black surface of the floor.

Dr. Shastri turned to Lissa. "You must be Miss Quintana-Green-Wolfe."

Lissa nodded. "Yes, how do you do?"

He smiled. "You'll find your room at the end of this passageway. It has your name on it."

"I'm Alek Calder."

"Yes, of course, I recall your application. Your door is on the left, about halfway in."

Lissa was impressed by Dr. Shastri's personal interest in his students.

"Where is everybody?" Alek asked cheerfully.

Dr. Shastri smiled. "Oh, yes, those who have arrived are down inside the mountain, watching the signal. There seems to have been a change in its pattern."

"Really?" Lissa said, intrigued.

"It's probably nothing." He sighed. "I've seen it too often. But my students tend to become very dedicated." He smiled at her.

Lissa felt a sudden twinge of doubt. Perhaps her father had been right after all, and this whole project was some kind of well-meaning failure. But then she reminded herself that this was only a training place. The Institute's main work was carried on elsewhere.

"I'm going to have to leave you now," Dr. Shastri said. "Dinner will be announced." He smiled at each of them in turn. "Good-bye." He turned and went back out into the windy courtyard.

Alek looked at Lissa. "What a grand old gentleman!"

"I'm not so sure," Lissa replied. He was staring at her with interest again, she noticed.

"Well, I'm off for a hot shower," he said, lugging his case down the hall. He came to his door, pressed his palm to the lock plate, and staggered inside as the door slid open. Lissa started down the hall toward her room.

Alek stuck his head out as she went by. "See you later, beautiful!"

His cheerfulness irritated her, but she smiled as she came to her door.

The ceiling flowed with white light as she entered the room and looked around. There were a bed, dresser, wall closet, and corner desk. The light-blue walls formed a cube-shaped space. A window looked toward the Himalayas, but when she went up to it she found that she could look down into the valley and see the river and the village nearly two kilometers below. Turning away, she put her shoulder bag down on the tall dresser, lay down on the unmade bed, and stared out at the sky.

There was a physical sharpness to things here, despite the sense of age. The monastery's insides were modern, but the exterior was old. She listened for sounds from the hallway; other students would be arriving. But she heard nothing; the room was sound proof. After a moment she was listening to her own breathing and pulse beat....

A chirping sound intruded on her feelings of strangeness. After a few moments she realized that it was her phone. She got up and went to the desk. The screen, she noticed as she sat down, was a built-in flat with a slide-away keyboard. She opened the sound channel, but left the picture dark. "Hello?" she asked.

"It's me," her father's voice said after the usual delay from Lunar orbit. "Just wanted to see if you made it safely."

She turned on the picture and smiled. "I'm fine, Dad. It was an easy trip." She waited for the delay, watching his youthful face. The screen color made his eyes overly blue, she noticed.

"Good. So what do you think of old Earth?"

"It's big. Too big." One, two, three.

He laughed. "You could spend a hundred years and not see it all."

She didn't answer.

"What's the matter?" he asked.

"Just disoriented, I guess." One, two, three.

"It'll go away," he said. "Call you in a few days, okay?"

"Sure, Dad."

The screen darkened. Her phone shut down automatically. She went back to the bed and lay down.

"This is Dr. Shastri," a voice was saying from a great distance. Lissa opened her eyes, realizing that she had fallen asleep. "Dinner will be served in twenty minutes," he said over the intercom. "I look forward to seeing you all there."

She got up and went over to the bathroom door. It slid open when she touched it, and she saw a small area containing a sink, toilet, and shower. A warm light went on overhead as she entered.

Five minutes later she came out into the hall.

"Hello, there," Alek said.

"Where's the dining area?" she asked sleepily, walking toward him.

"Across the courtyard, I think," he said, obviously glad to see her. "Took a nap, eh?" he asked, smiling. "The other students arrived while you were out."

"Let's go," she replied, not wanting his attention at the moment.

They came to the end of the hall, opened the heavy door, and stepped outside. The air was chill as evening fell. She looked up and saw stars appearing in the clear, deeply blue sky. She had come from that deep sky, she realized, suddenly not quite believing that she was on Earth. Maybe she was still in her room on Bernal, dreaming.

They crossed the courtyard and came to another large wooden door. Small windows on both sides spilled yellow light onto the stones of the yard.

"This must be the place," Alek said, opening the door. Lissa shivered as she followed him inside, glad that

she had put on warm slacks and a jacket.

They entered a low-ceilinged chamber. The walls were stone, but the ceiling was modern, set with light panels. One long table was laid out for dinner. Five students looked up as Lissa and Alek approached.

"Welcome!" Dr. Shastri called as he came in from a door at the right. "Please sit down." He pointed to two places at the end of the table as he took his place at the head.

Lissa and Alek sat down nervously. The other students were staring at them. One of the girls was smiling at Alek.

"Let me make the introductions," Dr. Shastri said, "now that we're all here. At my right, I'd like to present Maxwell Cater, Cyril Yoseloff, Louis Tyrmand, and Alek Calder." The first three students were pale and dark-haired. Lissa nodded to them, unable to keep from noticing that Alek was better-looking.

"At my left," Dr. Shastri continued, "we have Susan Falleta, Emily Bibby, and Lissa Quintana-Green Wolfe."

Susan Falleta was black-haired and thin. Emily Bibby was a plump redhead. Lissa smiled at them, realizing that she was not quite awake. She wasn't used to napping during the day, but the trip and the cool mountain air had put her away.

"I'd like to welcome you all to the Institute," Dr. Shastri said, "and I hope that you will all like it here. Let me say that you were chosen very carefully, which is why your group is so small. But I hope that makes you feel special. You're here not only to get an education, but to help solve one of the major puzzles of the century." He smiled in a sickly way. Lissa realized that she was very hungry. "I must admit that our record of solutions has not been a good one, and my own feeling is that you won't suddenly solve the riddle of the messages either—but you'll learn what it's like to go up against something immensely difficult and important. Now, as you know, others are working on this problem elsewhere. They are trained professionals, while you are fresh, young minds, who, it is hoped, will see the problem in new ways once you have prepared yourselves." He beamed at them, and it seemed to Lissa that he was planning to cook them all for dinner. "Now, doubtless, you are very hungry." He sat down. A gong sounded. The food was wheeled in on two trucks and served by male waiters. Lissa put her hand over her mouth to hide the sound of her swallowing as she smelled the food.

"I hate curry," Alek whispered next to her. "Makes me throw up."

She pressed her lips together and waited for her plate to be filled.

After dinner, Dr. Shastri took them down into the mountain to see the receiving room. They crowded into the elevator, and Lissa's stomach jumped as the floor seemed to fall away. There were very few elevators on Bernal One.

"This way," Dr. Shastri said as the doors slid open and he stepped out. "We're now a hundred meters down inside the mountain."

He led them through a short corridor. A door slipped open, and they entered a large chamber filled with computer terminals, small screens, and work stations; a 3-D screen covered the entire wall ahead of them. Two technicians sat watching a green snake play on the giant screen.

Lissa's eyes opened wide as she realized what she was seeing: this was the signal from the stars, shown visually, accompanied by a low-pitched audio analog. She thrilled to the alien snake's audiovisual gyrations, and wondered which had come first, the song or the visual dance. Was it just a matter of how

humanity's instruments had been set to receive the message?

"This is it!" Dr. Shastri shouted. "They are speaking to us, and we don't understand. Think—what might they be saying? Whole galactic encyclopedias of knowledge may be flowing past us as freely as the wind, but we're too stupid to capture even a small portion." He was looking at them with great interest, Lissa noticed, enjoying the effect that the screen display and his words were having on the new arrivals. She saw hope in his eyes. Perhaps this was the group that could decipher the alien language, he seemed to be saying, but there was also a touch of sadness in his face.

Lissa glanced at her companions. They seemed a bit put off by Dr. Shastri's deliberately dramatic style, but there was no denying the real fascination of the alien communication. It was there, something standing outside human history and experience, challenging their ingenuity.

Dr. Shastri pointed to a group of chairs. "Please be comfortable. I might as well give you my orientation talk right now. I imagine that we're all anxious to start work right away?"

Lissa nodded, but she noticed that her companions made no sign as they all sat down.

"What we do here," Dr. Shastri began, "is unique. Once every three years we take in a few students with only one purpose in mind—to acquire fresh young viewpoints from a variety of places in Sunspace and set them to the kinds of problems we're trying to solve." He paused and looked at them seriously, each in turn. "You are those young minds. Often our chosen students have no background in Artificial Intelligence, languages, math, or codes. But you will complement those of our researchers elsewhere who do. Your job is to play Watson to their Sherlock Holmes, it might be said."

"I think that's a bit insulting," Emily Bibby cut in.

Dr. Shastri smiled. "Not at all. A bit provocative, yes, but we do not mean to be insulting. Holmes needed Watson very much. One of two things will happen to you. You'll have enough and leave to study a more conventional curriculum at another college, or you'll develop in wonderful and surprising ways. Some of you may even become Holmeses. Now isn't that worth a try?"

Lissa felt a thrill at Dr. Shastri's words. He had described a feeling she had always had—her desire to grow inside. For a moment, as he looked at her, she felt that he could almost see what was waiting inside her to come out.

"One thing," he continued. "You will not lose, whatever you decide or achieve, because you will be studying enough here to attain the equivalent of any Liberal Arts or Basic Science undergraduate degree in all Sunspace. Our degrees are highly respected, and we have exceptional tutoring."

Lissa glanced at her companions. Their faces seemed less skeptical of Dr. Shastri's personal style. He was winning them over with his enthusiasm.

Behind him, on the screen, the green snake was dancing its weird, chaotic pattern. She noticed that the line never broke, however much it twisted, straightened, or bunched up.

"Are there any questions?" Dr. Shastri asked.

Susan Falleta raised her hand. "What do you think it's saying? What *could* it be saying? You must have some idea after all this time."

Dr. Shastri put his hands together behind his back. "Well, to begin with, it's saying that they are out there, that they exist, that we're not alone in the universe."

"Or existed once," Cyril Yoseloff said.

"Quite right, young man. It doesn't necessarily follow that they still exist. This signal may be all that is left of them."

"Does the signal ever repeat?" Lissa asked.

"No, not ever, not in the time we've been receiving it."

Cyril laughed. "Maybe it's a very long message."

"Maybe the signal is chaotic nonsense," Lissa said, "the point being that they expect a signal back of the same kind, showing that we can understand that much."

Dr. Shastri smiled and crossed his arms on his chest. "I'm sorry to tell you that you're at least the hundredth person to suggest that. We get letters every year with that bright idea."

Lissa felt her face grow warm. "But what if it's true?" she demanded.

Dr. Shastri gazed at her patiently, and she got the feeling that he wasn't quite the kindly old gentleman she had thought. "We've sent out replies," he said, "consciously and unconsciously, ever since we discovered broadcasting. But radio is too slow. Even if the nearer stars were inhabited, messages could take a decade and up to go back and forth. The speed of light is not enough. In any case, we don't think this signal is coming from any of the nearer stars, or from any star that we can detect. It seems to be coming from a blank point beyond Pluto's Orbit."

Lissa felt even more embarrassed, wondering how many others of her ideas were old hat. He hadn't answered her question, but she was too shy to ask it again.

"We tried directing a message at where this one seems to be coming from," Dr. Shastri added, "but we got no response. We wouldn't get one if that point were very far away, of course."

Louis Tyrmand raised his hand. "Lissa's nonsense message idea," he said, "assumes that the senders don't expect us to decipher anything. Maybe we should save ourselves a lot of trouble and try something else."

Lissa felt a little better. Louis had at least tried to take her idea a step further.

Maxwell Cater laughed. She looked at him, and he stared back at her with his brown eyes. "If the message is nonsense," he said, "then the work of the Institute has been a waste of time!"

"Not at all," Dr. Shastri replied. "If we could verify even that much, it would be an achievement. Mr. Tyrmand, getting back to your point, what else would you have us try?"

Louis shrugged and looked shy. "Well, maybe we could go out and try to find the source of the signal, for one thing, if it's not too far."

Dr. Shastri nodded, but said nothing.

Lissa glanced at Alek. He seemed amused and not about to say anything. Suddenly, she remembered an idea she had mentioned to her father.

"Yes?" Dr. Shastri asked as she raised her hand.

"Let's assume that the signal is chaotic, or even partially nonsense—"

"That's a big assumption."

"I know, but consider, for the moment—why would it be that way, if it is? And I don't mean that they simply want us to reply in kind."

She looked around. No one seemed about to give her an answer.

"You have something to say," Dr. Shastri said finally, "so please don't hold us in suspense."

"Well," Lissa began, "I think that a chaotic or partially meaningless message would have an important effect in shaping our attitudes toward contact with another civilization. Our failure to decode the messages would give us a chance to live with the idea of contact with aliens, until we took it for granted that it would happen one day, and we would be ready."

"That's interesting," Dr. Shastri said. "Can you elaborate?"

Lissa took a deep breath. "Well, I imagine, if this is true, that the time would come when some part of the signal would suddenly become understandable ... but we couldn't really be sure if the nonsense parts had been meant to slow us down, unless we could be sure they were nonsense...." She heard the doubt in her voice as she finished.

Dr. Shastri's eyebrows went up, but he shook his head, and Lissa was suddenly afraid that he was going to make fun of her.

"Unfortunately," he said, letting his hands fall to his sides, "some of us have had that hope, that suddenly the signal might change, even though we've not given your reason for a nonsensical signal. You're expressing a kind of faith, I suppose, a blind hope that revelations will come to us. But what do you think we might learn at that point?" He smiled. "I know, my last question is infinitely hard and can't be answered by anyone right now."

She felt embarrassed again. Her ideas were amateurish. She struggled to think of something more to say. "They've made it hard for us," she continued, "because they want us to be ready to talk to them when the time comes, so that we won't be hurt by a sudden contact with an advanced civilization. We'll have time to get used to the idea, by having this mystery signal around for a while. Look, why didn't we pick it up in the twentieth century? We were listening. Why did it become so clear recently? It was a silent universe up until less than twenty years ago ..." Again she felt the doubt creeping into her voice.

"So what are you getting at?" Shastri demanded.

"I don't know yet," Lissa replied impatiently, "but I feel there's something in this."

"Perhaps. Now I think that's enough for today. I think this gives you a taste of what we're up against. For most of your time you'll follow the reading schedule that you'll find on your screens. This room will be open to you at all hours, in case you wish to come and study the signal display. The Artificial Intelligence will punch up all past receptions for you, in case you wish to make your own comparisons. And from time to time I will discuss things with you. Students from other Institute centers will visit us occasionally."

Lissa looked around at the other students as they all got up to leave.

"Sleep well," Dr. Shastri said. He turned and left by another door.

Alek led the way out to the elevator. They all crowded in.

"So what does anyone think of him?" Max Cater asked loudly as Lissa's stomach lurched.

"I think he's very impressive," Susan Falleta said.

Max laughed. "A bit of a fake, don't you think?"

Lissa felt that there was some truth in Max's words, but maybe not all that much. "He digs around in your head nicely," she said as the doors opened and they came out into the hall that led to the courtyard. She felt suddenly that Shastri had almost pulled out of her what she had been trying to say, but the process had ended too soon. She also suspected that Shastri had been holding things back, as if he didn't want them to know certain things yet. Excitement filled her mind. More was known than was being revealed. The contact project was about to take a big step forward, and she had arrived just in time

"After all," Max continued, "what has he ever done besides discover the signal? Anyone could have picked it up!"

"How did you ever get in here?" Alek asked harshly. "Don't you know the man's work in astrophysics?"

Lissa looked at Alek with surprise, and smiled. He obviously knew much more than his casual manner revealed. Max did not reply to him.

They came out into the courtyard. It was dark, and the north wind was blowing hard across the monastery. She looked up at the stars. There weren't as many as she could see from Bernal, where the view was perfectly clear, but somehow the aura of Earth's atmosphere gave the stars a strangeness she had not known before. Most of humanity had always seen the stars through atmosphere, twinkling, as if about to catch fire.

"I like it here," Lissa said as they crossed to the dorm wing.

"So do I," Emily Bibby added.

"It's interesting, so far," Alek added.

Max Cater chuckled to himself. Cyril Yoseloff and Louis Tyrmand said nothing. Lissa noticed that Susan Falleta was staring at Alek. The group reached the door that went inside. Lissa felt a bit of a letdown as they went down the corridor and each of them dropped off at his or her room.

"See you tomorrow," Alek said. He opened his door and disappeared inside before she could answer.

She came to the end of the hallway, pressed her palm to the ID plate, and went inside as the door opened. As she undressed, she realized tiredly what she would have to do: Her best would have to be even better here. She wouldn't be able to present just anything that came into her head; too many bright people had hit upon her ideas over the years. She would read and study and listen, and one day the stars would speak to her...

[|Go to Table of Contents |](#)

5

Lissa awoke early and lay in bed looking out at the mountains. The wind, she knew, was frigid out there, and it blew constantly. She stretched, feeling fresh and encouraged, and wondered how she could have felt down at all last night. Everything was still waiting to be accomplished, and there would be enough time to work around every failure, every disappointment.

She thought of her parents. Morey would be getting ready for his Monday morning physics class. Sharon

would already be at the hospital, or she might even have been there all night. They were thinking of her, Lissa felt sure.

As she gazed out at the piece of blue sky visible through her window, she thought of where she had been born—in a small town on the inside of a spinning hollow ball located in the Moon's Orbit. The only other worlds she had known were the other space colonies at L-5 and L-4 and the growing Lunar settlements. She had thought more about the colonies on Mars, the asteroid hollow orbiting Mercury, the habitats in Saturn's rings, than of Earth. Yet here she was on the home world, where everyone had come from originally. For a moment it seemed a backward thing to do, to come here, the place of countless old and dead civilizations, where for thousands of years people had warred and died; even in the last century millions had died in world wars. There was no place on the planet where people had not died, where human bones did not lie buried in the ground. Suddenly she felt the age of the Earth, and she startled herself with the fact that no one had *built* the Earth; it had condensed out of interstellar materials in orbit around the youthful sun, and after billions of years humanity had evolved from the thin layer of bio-matter that had formed in the outer crust. Some crust, she thought, sitting up and looking at the mountains. But even though the Earth had not been constructed especially for human beings, she realized with curiosity, it had become livable because human life had evolved by adapting to the planet's environment. The habitats she knew had only taken that environment of earth, air, and water out into space.

She got up finally and sat down at her desk. Her screen tilted up, and she entered her palm print. A greeting appeared:

GOOD MORNING. I AM YOUR PERSONAL ARTIFICIAL INTELLIGENCE. MY NAME IS AUGIE. HOW WOULD YOU LIKE TO ADDRESS ME—WITH WORD DISPLAY OR WITH A VOICE? WOULD YOU ALSO PREFER TO GIVE ME ANOTHER NAME?

Lissa typed:

WORD DISPLAY WILL DO JUST FINE FOR NOW. AUGIE IS A GOOD NAME.

Augie replied:

THANK YOU. LET ME PRESENT YOU WITH YOUR SYLLABUS FOR THIS TERM.

A long list of book titles began to march up from the bottom of the screen. The list included science and humanities, current texts, and key works in the history and methodology of contact with alien civilizations, including introductory works on exobiology and exopsychology. Logic, mathematics, and languages made up a separate list.

Augie added some comments:

YOU ARE ENCOURAGED TO BROWSE AND READ SECTIONS OF WORKS THAT STRIKE YOUR INTEREST. DO NOT TRY TO BE SYSTEMATIC AT FIRST, BUT MOVE TOWARD THAT APPROACH AS YOUR INTEREST GROWS.

The rest of the list marched through, and Lissa realized that this part of the Institute was a kindergarten. Elsewhere in Sunspace, the advanced listeners were at work, examining the alien signal with a sophistication that she could only guess at. As the list ended, she realized that the Institute's educators believed that to break the alien message might require the sensitivity and intellect of all human history and experience, concentrated, of course, in highly motivated, trained individuals. She wondered whether she could ever become one of those individuals. It was possible to fail at this school, she told herself; perhaps not in terms of grades, but by being unable to handle this kind of independent study. Some people needed rigid schedules and clearly defined courses. There was only one way to find out—by trying; and

maybe one day they would send her to a more advanced center, where she would work with the finest Artificial Intelligences and colleagues.

A terrible fear suddenly crossed her mind: What if all humanity's efforts were not enough to understand the message, ever? What would that mean? She couldn't believe that was possible. Still, her father's criticism that the project was taking too long was bothersome. That humankind had failed to unravel the signal's meaning might indicate something, but it couldn't be that humanity was too stupid. It just couldn't.

She asked Augie a direct question:

WHY DO YOU THINK IT'S TAKING SO LONG TO DECIPHER THE ALIEN MESSAGE?

Augie seemed to hesitate as she took her fingers off the keyboard. Then his reply came up on the screen:

IT WAS PREDICTED AS EARLY AS A CENTURY AGO THAT SUCH A COMMUNICATION WAS NOT LIKELY TO BE SHORT. IT WOULD BE ENCYCLOPEDIC, AND PROBABLY SENT OUT ON A CONTINUING BASIS BY A CIVILIZATION USED TO MAKING SUCH TRANSMISSIONS ROUTINELY. THE TWENTIETH-CENTURY SCIENTIST PHILIP MORRISON WROTE IN THE 1980S THAT SUCH A MESSAGE "WILL HAVE A LOT TO SAY," AND HE PREDICTED THAT "IT WILL NOT BE SOMETHING THAT *THE NEW YORK TIMES* WILL BE ABLE TO PRINT IN ITS ENTIRETY. INTERPRETING IT WILL, I THINK, BE A LONG, SLOW PROCESS, COMPARABLE WITH THE GROWTH OF A SCIENTIFIC DISCIPLINE. IT WILL TAKE DECADES TO UNDERSTAND, TO STUDY, TO ARGUE AND WRITE ABOUT."

Augie stopped. She felt disappointed. He hadn't told her anything that she didn't know.

Lissa typed:

IS THAT ALL YOU CAN TELL ME?

THAT IS ALL.

She knew what her father would say. There had been no progress at all. The same ideas were current today that had been a century ago, long before the signal had even been picked up. It was depressing, unless Augie knew more and was not allowed to reveal it to students. After all, Augie was only one small part of a much larger Artificial Intelligence, the part that had been assigned to work with her.

She typed in another question:

ARE THERE OTHER DATA BASES FOR THIS QUESTION?

NOT TO MY KNOWLEDGE.

ARE YOU SURE?

OF COURSE, LISSA.

ARE ALL DATA BASES ON THIS SUBJECT AVAILABLE TO YOU?

PROBABLY. BUT THE QUESTION CANNOT BE ANSWERED AS PUT. I DO NOT GATHER DATA. THEY ARE GIVEN TO ME.

Lissa sighed and punched up the first assignment: selected readings from Norbert Weiner's work on cybernetics and from Noam Chomsky's explorations of human language, both from the late twentieth

century.

[|Go to Table of Contents](#) |

6

Lissa came out into the hall and saw Susan Falleta coming out of Alek's room. The thin, black-haired girl smiled at her and hurried away toward the door to the courtyard. Lissa walked slowly down the hallway, to give Susan a chance to get outside. Alek seemed a fast worker, she thought, smiling to herself, or maybe it was Susan who had made the first move. Perhaps it was nothing at all, and they had been talking about something. No way to tell. Lissa was surprised that the incident interested her at all.

She stopped and buzzed Alek's door.

"Forget something?" he asked as it slid open. He was wearing only a towel. "Oh, it's you. Hello."

"Sorry," Lissa said, smiling. Alek glanced down the empty hall, then looked embarrassed.

"Don't worry, she's gone," Lissa said, making sure that he would know that she had seen Susan. "Going to lunch alone?"

"No, I'm not hungry. Got to get started with Felix."

"Felix?"

"That's the name he gave when I turned on the screen," Alek said.

"Oh. Mine's Augie. Don't worry, it's just three short essays today, and you can skim the first one."

"You wanted me to go to lunch with you?" Alek asked.

"Oh, not really," Lissa said. "Just wanted to say hello." He's conceited enough to think I'm here to put in my bid for him, she thought, feeling a momentary twinge of competition with Susan; but she brushed it away. Who cares? I've got better things to do. "Bye," she said, walking away. She heard the door slide shut behind her, and she quickened her pace down the hall.

Her mother would have disapproved. Lissa remembered her saying, "You don't take enough interest in boys, Lis, and you don't have any real girl friends."

"Come on, Mom," Lissa had replied. "You know I decided what I wanted to be long before I hit puberty. All this stuff about sex and romance came later, and all I can see is that it will slow me up. I'm not a toy for boys to play with, and I'm not a baby machine, either."

"No one says you have to be. But don't you have feelings about boys?"

"Sometimes."

Lissa came to the door, pushed it open, and went out into the courtyard. The sun was bright, and the cool wind was blowing, as usual. It seemed to her that there was much more to Alek than was suggested by his easygoing manner. He intrigued her, but she was not here to distract herself with romance, she told herself, wondering if he found her interesting. He had looked good in his towel. His legs were not the usual hairy shanks. They were well shaped and just hairy enough. A pleasant shiver passed through her as she started across the stony courtyard toward the cafeteria.

Halfway there she changed direction and went to the low stone wall instead. As she looked down at the valley, she smiled to herself, thinking that her mother might like Alek; but then again, Sharon would probably approve of any boy who wasn't a complete toad.

Far below, nearly two kilometers down, the river wound its way among the greenery, passing through what seemed a toy village. Lissa gazed down into the valley for a while, the wind sighing in her ears, and the whole scene became unreal to her again, as if she were somewhere else and only dreaming about being here. If she turned her head too quickly it would all disappear and she would be at home, where there was no sky, really, only the curving landscape closing up the world, imprisoning the sky within...

She turned her head and saw Alek standing near her.

"Hello again," he said, looking at her strangely. She realized suddenly that she had betrayed her interest in him when she had knocked on his door.

"It's chilly out here," she said, zipping up her windbreaker as her feelings raced.

Alek nodded and leaned against the stone wall. He seemed tense. Lissa smiled, not knowing what she was feeling. He seemed relieved.

"And the air," she continued. "It's like a magnifying lens, making distant things look so clear that you think they're somehow inside you."

"I know what you mean," he said, glancing down into the valley.

"I'm sorry if I disturbed you," she said after a longer silence.

"Oh, don't worry about that," he replied vaguely. "Sue is from New Zealand. She thought we might have something in common, being as we're from the same part of the world." He was staring down into the valley now.

"And do you?"

He shrugged without looking at her. "No more than most people."

She liked his profile. It made him look shy, not as intense as when he was looking directly at her. Whatever had happened between him and Susan had made little impression on him, it seemed.

He turned and looked directly at her. "I like you much better than her," he said softly. "Will you give me a chance to get to know you better?"

Lissa breathed deeply and smiled. "Why, sure. You don't have to ask." Looking at him was very pleasant.

"Well, I thought I did have to ask," he said very seriously.

"But why?" She felt idiotically concerned by his question.

He put his hands into the pockets of his sweater. "Well, you're here to work very hard, and that leaves little left over for much else. I suppose I think of you as a hard-nosed type."

Lissa drew a deeper breath. She didn't like him thinking that he had her pegged. "Sure, I feel committed to the work here, but isn't that true of everyone who comes here?"

Alek smiled and brushed the hair from his eyes. "Maybe. But you saw how few new students there are.

Three decided not to come at the last minute. The truth is, they take anyone who has the makings to get in, and some of them don't really know what's in them. That's what my dad says."

"I don't quite understand what you're saying," Lissa replied.

"It means that you may have the brains, but it may not mean that much to you what you do with them."

Lissa shook her head in denial. "Not here. The entrance standards are too high. If no one met them one year, they wouldn't take anybody at all. You're talking about people who don't care, who lack ambition."

"But the school wants that, in part. Sure, they pick mavericks, but not so extreme they can't be shaped. Dr. Shastri is a smart old codger."

"Either you want to come here or you don't," Lissa insisted. Alek was becoming bothersome, and that disappointed her, because she liked him.

"Do you always feel that you have to agree with people you like?" he asked mischievously, as if he had read her mind.

She felt herself blush. "No, but it would help," she said softly.

"Okay, I'll agree with you. Who knows, you may be right, and there are more important things. I was only saying that people make mistakes." He was smiling at her as he leaned against the wall, and he looked just about perfect. The smile became a grin as she gazed up at him.

"Let's go to lunch," he said.

"So what does anyone think of the stuff assigned this morning?" Max Cater asked as they sat around the same table where they had eaten dinner on the previous evening.

"Junk and beginner's pablum," Emily Bibby replied.

Louis Tyrmand nodded in agreement.

"We've got to start somewhere," Susan Falleta said, looking at Lissa.

They were all silent as the waiter rolled in a large cart and left it for them to serve themselves. Lissa felt uncomfortable and out of place, but she hoped that would pass.

"It's kind of lonely here," Cyril Yoseloff said unexpectedly.

Lissa glanced at Alek. *I told you so*, his eyes seemed to be saying; *not everyone can be like you*.

"What's the matter with all of you?" she demanded suddenly. "Didn't any of you *want* to come here?"

"Sure," Max answered, "but maybe we won't like it"

"It seemed like a different place to go," Louis said.

"But we haven't even started," Lissa protested.

"We know that," Max said tiredly, looking up at the ceiling.

"What is it exactly you're complaining about, Max?" Emily asked.

"There were going to be three more of us," Max answered. "It bothers me that they bowed out. Three of

them at once. Why?"

"We could have used the company," Louis said sadly.

"It bothered me also," Cyril said sarcastically.

"Yeah," Alek added. "I guess they wanted to go to a place with a more structured environment."

Lissa glared at Alek. He was making fun of the orientation-brochure essay. But as she stared at him, she began to smile. Emily giggled. Louis laughed.

Lissa sighed. "I guess I expected that everyone I'd meet here would show, well, more dedication."

"We're here, aren't we?" Louis said.

"Let's eat before it gets cold," Susan said.

"Great idea," Alek said, grinning.

As they got up to go fill their plates, Lissa realized what had been going on. Two of the three students who had decided not to come were female. Alek was looking at her intently as she came to the food cart and began to fill her plate.

"Just got it, didn't you?" he asked softly.

She nodded. "A social life is that important to them?" she whispered.

Alek shrugged. "Maybe they'll get over it."

She had thought, somehow, that people would not be coming to the Institute in search of the opposite sex. The other three students would have made the class fifty-percent female, however, and that might have been better in the long run. Still, she was relieved that her classmates' complaints seemed to have little to do with their studies.

"Can I sit next to you?" Alek asked.

"Sure, I don't mind."

"Food looks great!" Emily said loudly, staring at the varied display of Indian soups and dishes.

[Go to Table of Contents](#) |

7

Lissa studied hard during the next three months, reading every assigned text well ahead of the schedule. Dr. Shastri lectured on the history of the project, but he was at the school for only ten days out of every month, so they often had to hear him as a hologram recording. Max thought it the height of humor to walk through the 3-D image in the middle of a lecture.

Lissa saw Alek at meals and in the social room, but they were never alone for long. She woke up one morning and realized that she was afraid of him. He could take away everything she was and wanted to be and make her into someone else—and she might even like it. Love, at last, her mother would say, in a daughter who had been oblivious to puppy love and had never had a crush. I'm weird, Lissa thought one afternoon as she sat at her desk. Definitely weird. That was okay, in a way; everyone here was weird.

Emily showed her imaginative menus that she had made up and asked if they looked delicious. Max asked everyone to tell him the color of his eyes once a week, as if he were working hard to change his shade of gray. Susan always looked guilty of something. Louis built toy houses out of toothpicks, which angered the chef. Cyril's love was staring at 3-D slides of butterflies in his spare time, but he never talked about his hobby. It seemed clear that Max had found a girl friend in the village, because he disappeared regularly every Friday evening; but he never brought her up the trail to the Institute. All the students except Lissa were from Earth. I'm the only offworlder, she thought, so that makes me weird in their eyes, as well as for other reasons.

Only Alek seemed normal, even ordinary. Why was he here? The strangest thing he did was hike down to the village and come right back, for the exercise. Sometimes he would ask her to come, but she never accepted. What did he feel for the alien signal? Maybe he just couldn't show it, and behind that wonderful smile lurked a brain more alien than the aliens who had sent the signal.

Her door chirped. She got up, went over, and opened it.

"Hi," Alek said, smiling as if he had been reading her thoughts.

"What is it?" she asked firmly.

He frowned. "Well, I just can't get enough of you at lunch or the social area. I think you're avoiding me."

"I am busy."

"So are we all."

"I should hope so," she said.

He was smiling again, trying to break her control. "Aren't you going to ask me in?"

She shrugged finally. "Okay, for a few minutes." She went back to her desk. He came in and sat down in her armchair.

"So what do you think of this place by now?" he asked, putting one leg over the armrest and still managing to look serious.

"I don't know," she said, relaxing in her swivel chair. "We get to work on our own a lot."

He nodded. "But we could do the reading anywhere. And it's strange in the signal room, watching that dancing line and not being able to do anything about it. I think Institute people are watching us to see how we react. We're just test subjects to them. I know I haven't had any bright ideas about the message, and probably won't for a long time. Have you?"

"No," Lissa replied, watching him warily.

"It's as if there's nothing at all to do here, and there never was."

"It's too early," Lissa said impatiently.

"Could be," he said slowly, looking at her. "I've been thinking about you...."

"What?" she asked, annoyed by his steady gaze.

"You, Lissa, you. Don't you see, don't you feel?" He put his foot back down on the floor and sat forward. His eyes were soft and caring, his voice low and rumbling. She tensed.

"What are you saying, Alek?"

"I'm attracted to you. I like you lots, but you haven't given me a chance to know you at all. You've been avoiding me."

"No, I'm busy, as you should be." She swallowed hard, knowing that it was a sign of weakness.

"Come on, Lissa," he said, leaning back, "what are you afraid of?"

She was silent, even though she had wanted him to notice her.

"You're blushing," he said.

She stood up. "You'd better go."

He got to his feet and stepped toward her. "You're afraid of me, aren't you?"

"No ..." she started to say as he leaned over and kissed her on the cheek.

"There," he said. "Am I such a monster?"

"I never said—" she began, but the picture of Susan Falleta coming out of his room weeks ago now flashed through her mind.

Alek was turning to leave. Lissa hated herself, but she said nothing as he went out the door and it slid shut behind him. She sat down in the armchair and took a deep breath, wondering at how Alek had stirred her up inside. What am I? What is a human being, she asked herself, and why is so much of ourselves hidden? Talking to Alek had been like sleepwalking.

Then, as she breathed more evenly, she admitted that she was fearful of falling in love with Alek, or with anyone.

She got up and went to the door. It opened, and she peered cautiously out into the hall to see if it was empty. Then she hurried toward the exit and stepped out into the sunny courtyard.

The wind was cool, as usual. She crossed to the main wing, went inside, and took the elevator down into the mountain. The doors opened, and she walked down the corridor and entered the viewing room.

The place was often empty during late afternoon. It was her favorite time to watch the dancing signal on the big screen.

But she thought of Alek as she sat down in one of the empty chairs. She would have to make a decision about him and stick to it.

The signal danced on the screen, loosening and tightening as if being stretched between the ends of the screen, forming jagged triangles, deformed circles, and ovoids. It was an infinite string having a nervous breakdown, crying out silently ...

Lissa got up and went over to one of the work terminals. The console lit up as she sat down. She punched up a review of past approaches to deciphering the signal. She had done so before, each time hoping to see more by standing on the shoulders of those who had worked in this field. The small screen ran the review at the scanning speed to which she had become actually accustomed:

The earliest efforts to decipher the signal were based on the study of Earth's dead languages. Researchers looked to see if the signal was being repeated in different ways, hoping to establish at least

the possible existence of an interstellar Rosetta stone (the original presented texts in Egyptian hieroglyphic and demotic characters and in Greek side by side, all saying the same thing). No such suggestion of a repetition was found; but even if it had been found, it would have been a small gain, since there is no alien language known to us that could have been used as a guide.

Lissa ran the text forward past the more familiar material, hoping to find a point she had overlooked:

SOME RESEARCHERS ASSUMED THAT A MESSAGE FROM AN ADVANCED CIVILIZATION WOULD BE MADE INTENTIONALLY EASY TO DECIPHER, BUT THIS IDEA ALSO PROVED FRUITLESS. EITHER THE POINT OF THE MESSAGE WAS TO SIMPLY ANNOUNCE THE EXISTENCE OF A SENDER, OR THE MESSAGE WAS NOT AIMED AT US OR ANY EMERGING CIVILIZATION. IT WAS A COMMUNICATION ABOVE OUR HEADS, BETWEEN SUPERIOR CULTURES, AND WE HAD PICKED IT UP BY ACCIDENT.

STILL ANOTHER APPROACH INVOLVED RUNNING ANALYSIS (USING ADVANCED ARTIFICIAL INTELLIGENCES) OF THE MESSAGE ACCORDING TO ALL KNOWN CODES. THIS WAS THE SIMPLEST APPROACH, SINCE COMPUTER MINDS COULD COMPLETE THESE OPERATIONS IN A MATTER OF MINUTES. BUT THE MESSAGE MATCHED NO KNOWN CODES, PAST OR PRESENT. THERE WERE A FEW ACCIDENTAL MATCHINGS, IN WHICH THE MESSAGE SUDDENLY SEEMED TO MAKE A STRANGE KIND OF SENSE, BUT THIS HAD BEEN FORESEEN AND THE RESULTS HAD TO BE DISCOUNTED. THE PICTORIAL APPROACH—ATTEMPTS TO MAKE PICTURES FROM THE MESSAGE—ALSO YIELDED MERELY FORTUITOUS RESULTS. PICTURES EMERGED THAT SEEMED TO MAKE SENSE, BUT WHICH ON CLOSER EXAMINATION WERE SEEN TO BE CLEARLY IMPOSSIBLE. BUT THIS APPROACH IS BEING CONTINUED, SINCE AI MINDS MAY STILL FIND A MATCH SOMEWHERE IN THEIR VAST LIBRARIES OF ASTRONOMICAL RECORDS ...

Lissa ran the material on fast forward, bypassing a mass of illustrative material.

ANOTHER ATTEMPT WAS MADE FROM THE VIEWPOINT OF EXO-BIOLOGY AND ITS BRANCH EXOPSYCHOLOGY. WITH AI ASSISTANCE, COUNTLESS BIOPSYCHOLOGICAL MODELS OF POSSIBLE INTELLIGENT LIFE-FORMS WERE CONSTRUCTED, IN AN OPEN-ENDED RUN, BASED ON THE ASSUMPTION OF EVER-EXPANDING INITIAL CONDITIONS OF EVOLUTION AND BASIC LIFE MATERIALS, WITH A VIEW TO DERIVING NEW LANGUAGE POSSIBILITIES. BUT NO MATCH WITH ANY PART OF THE SIGNAL HAS EVER EMERGED FROM THIS OVERLY AMBITIOUS APPROACH, ALTHOUGH THE ATTEMPT IS STILL CONTINUING. THE CRITICAL OBJECTION TO THIS APPROACH IS THAT WE CAN NEVER HAVE ENOUGH DATA TO MAKE IT WORK, EXCEPT AFTER THE FACT. WE DO NOT KNOW THE SPECIFIC LOCAL PHYSICAL AND SOCIAL CONDITIONS THAT WOULD LEAD TO THE EMERGENCE OF AN ALIEN LANGUAGE; SUCH LANGUAGES MUST EMERGE IN BASICALLY UNPREDICTABLE WAYS. INITIAL CONDITIONS AND BASIC LIFE MATERIALS CARRY NO UNIQUE POSSIBILITIES, BUT COME TOGETHER IN AN ENVIRONMENT TO PRODUCE NEW PROPERTIES THAT ARE NOT FORESEEABLE IN THE BASIC MATERIALS. WE COULD NOT PREDICT, FOR EXAMPLE, THE GROWTH OF A NATION'S SOCIAL HISTORY FROM KNOWING HOW COMPLEX MOLECULES COMBINED TO FORM THE FIRST LIVING CREATURES ON EARTH. STILL, THIS APPROACH, ASSISTED BY THE VAST SEARCHING AND RELATIONSHIP-FORMING CAPACITIES OF AI MINDS, MIGHT HELP US GUESS SOMETHING. THERE IS A SLIGHT CHANCE THAT SOME KIND OF CORRELATION MIGHT EMERGE FROM COMPARING

OUR PROGRAM RESULTS WITH THE CONTINUING ALIEN MESSAGE.

Reviewing this material always made Lissa impatient. Even her own ideas had been thought of by someone else:

ANOTHER APPROACH IS NOT BASED ON DIRECT THOUGHT, BUT ON A LONG-TERM FAMILIARITY WITH ALL THE ABOVE APPROACHES AND THE HOPE THAT SOME INTUITIVE LEAP OR SUDDEN SIMPLIFYING INSIGHT MAY OCCUR IN THE MIND OF A RESEARCHER NOT YET OVERCOME WITH THE WEIGHT OF FAILURE IN THIS FIELD. BUT THIS IS PROPERLY VIEWED AS A LONG SHOT.

FINALLY, IT IS POSSIBLE THAT SOME PART OF THE MESSAGE MAY BE DIRECTED AT US SPECIFICALLY AND THAT THIS WILL BECOME CLEAR TO US IN TIME.

Lissa sighed as the review ended. She had run her own exploratory queries into each of these approaches, hoping to glimpse some mistake, or something that had been overlooked. But she had merely repeated what had been tried by countless questioners. The massive record of how human

beings and Artificial Intelligences had struggled to understand the alien signal, without seeing in it only what they wanted to see, seemed a hopeless jungle of blind alleys. Perhaps only a direct revelation, preferably in some Earth language, would be enough to break the message; but that would be asking for a miracle. She concluded that the best possibility now seemed to be in the area of picture assembly. Somewhere among the millions of star photos and spectrum mappings there might be one that would match one received from processing the signal. Such a match would demonstrate that it was not some chance assembly of information, but a picture that might reveal something, say something so clearly that it would be worth a million words....

She looked up at the large screen. The signal continued its endless dance. *What are you, she demanded silently. What are you saying? Why play charades with us?* Suddenly she yearned to be taken inside an alien mind and shown around. She wanted to see thoughts that were not human but just as good in a very different way. She closed her eyes and imagined those thoughts as winged creatures of light fluttering inside an alien skull....

"Lissa?"

She opened her eyes and saw Dr. Shastri smiling at her.

"Yes?" she heard herself say in a wavering voice.

Dr. Shastri sat down in the chair at her right. "You come here often," he stated, "to commune with our stubborn mystery."

"Yes" she repeated.

"It appears to me," he continued, "that you may be ready to take the next step."

Suddenly she was curious. "What do you mean?"

He smiled sourly. "You know that this place is a selecting stage, and that more advanced work is being done elsewhere."

"Yes," she said again. "And I know that you don't just recruit people from here, but from everywhere you

can. This place isn't very important, is it?"

He looked up at the signal. "Do you really think it's saying anything?"

She swallowed hard. "Well..."

"I want your honest reaction, what you feel most."

Lissa thought again of what her father would say, and in a way he was right. "It isn't about anything."

"Go on."

Lissa tensed. "I'm not sure. It's just a feeling."

"Don't worry, think. Why would they want only to catch our attention?"

"To accustom us to the idea of their existence."

"Yes, you've said that before, but there's more, isn't there?" His eyes sparkled. "Think carefully."

Lissa's mind leaped. She knew, but held back.

"You've guessed it," Dr. Shastri said.

"I have?"

"It's not so difficult. Many of us have had the same suspicion for quite a few years. It makes a good test for those who go on to the next stage."

Lissa took a deep breath, and she realized that all thoughts of Alek had left her mind. She felt a bit guilty about it.

"Well?" Dr. Shastri demanded sternly. "What is your insight?"

"They've gotten our attention with this signal, but the real communication is still to come, in some other way."

"Why?"

"Well, that fits with my idea that a signal need not contain a message of any kind. It may be intended to get the receiver to think about why and by whom it's been sent. Anyway, that's my idea. Not so good, huh?"

"It's very good," Dr. Shastri replied, crossing his legs. She noticed his gray slacks and old-fashioned jacket. Only his collarless white shirt seemed at all fashionable. "Can you be more specific?"

"What do you mean?" she asked, suddenly feeling stupid.

"How else would they be signaling us?" Dr. Shastri asked insistently. "Assuming, of course, that this is only the preliminary signal."

"Well—on another frequency, perhaps through some more advanced means?" She searched for a clue in Dr. Shastri's leathery face.

He smiled. "One more step, Miss Lissa Quintana-Green-Wolfe."

The answer seemed obvious. Lissa felt disoriented. "But we don't know how to receive, much less send, tachyons," she said finally.

Dr. Shastri laughed. "Of course we do! I'm going to send you where they're getting ready to do just that, to our advanced listening post out beyond Mars."

Lissa's mind raced. Tachyons, theoretical faster-than-light particles that couldn't go slower than the speed of light. One might communicate with all parts of the universe very quickly. No need to wait for the slow crawl of light-speed radio waves, by which a simple exchange of hellos between distant civilizations would take decades, centuries, even millions of years. It was one thing to understand the possibility of tachyon communications and something completely different to know that it was about to be tried.

"Your transfer is not meant to be an honor," Dr. Shastri added, "but you are excellent raw material and should have this experience."

"I've only guessed what others have done," Lissa said, "and you prompted me."

"Ah, but you always respond so well. Few students leap ahead as you do. Even very worthy ones are already too conservative, too worried about their scientific careers to speculate creatively. I may be wrong about you in the long run, but you seem to combine thoughtfulness with a wild streak more than any of our students have for some time."

"Thank you," Lissa said, smiling, and for a moment she thought that he might be describing himself, as he had been many years ago.

"You'll continue with your routine degree work, of course. The others will do the same here, as well as studying the radio signal."

Lissa scowled. "Even if you think there's nothing to learn from it?"

He looked at her seriously. "We might be wrong, and this might be the signal, after all. The others will get their education, and they might still discover something. All avenues must be left open." He laughed again. "Exciting, isn't it?"

"But you believe tachyons is the right way to go?" she asked insistently.

"At least until we get the receiver set and it proves otherwise."

"Will we be able to send tachyons out?"

"Probably. The equipment is just being completed."

"Why did it take so long?" Lissa asked. "We've known about tachyons since the last century."

"Because we had to find a mini-black hole to serve as the trap in the heart of the receiver."

Lissa took another deep breath. "And you actually have one?"

Dr. Shastri nodded. "We found it in a small asteroid that came in from the outer solar system on a long cometary orbit. We were very fortunate."

Lissa was silent for a moment. "Is anyone else going from here?"

"Susan Falleta."

"And no one else?"

"Not immediately. Of course you'll have to stay to the end of the term. One or two of the others might get a chance later."

"I hope they don't misunderstand," Lissa said.

Dr. Shastri got up. "You'll get a formal transfer letter on your work screen. I have to be going now." He turned, crossed the large chamber, and left by one of the side exits.

Lissa looked up at the dancing line on the big screen. Her father had been right all along. The signal was a big fake, in a sense. Then she thought of Alek, realizing that they would be separated when she left for Mars.

[|Go to Table of Contents |](#)

8

Alek was waiting in front of her door when she came down the hallway. She smiled as she came up to him.

"Can I talk to you?" he asked.

"Sure, come in." She pressed the plate with her palm, and the door opened.

The ceiling flowed with light as they went in. Alek again sat in the armchair, and she turned her desk chair around to face him.

"I'm sorry," he said painfully.

"We were both at fault," she answered immediately. "I didn't discourage you at all."

"You did a little." He was looking at her longingly with his blue eyes. "You don't really want to hear what I have to say, do you?"

Her phone chirped before she could answer. "Excuse me." She swiveled her chair around to face the desk and opened the audio.

"Hello?" she asked, leaving the screen dark.

"Lis, it's me," her mother's voice said. "Something wrong with your screen, or do you have guests?"

Lissa glanced over her shoulder. Alek was leaving. She waited until the door had slid shut behind him, then opened the visual link. Her mother was smiling.

"No, I'm quite alone," Lissa said. One, two, three.

"Sorry I haven't called for so long, dear."

"That's okay, I understand," Lissa replied, thinking about Alek. One, two, three.

"Nothing new to report here," Sharon continued after the delay. "I'm still working too hard at the hospital, and your father complains that he doesn't see enough of me."

"Poor Daddy," Lissa said, and waited.

"You seem preoccupied, dear."

"Just the delay. It makes us all sound a bit brain damaged. Mom, I've got something to tell you. They've selected me for an advanced program. It'll begin next term. I'll be going out to Mars, then to the asteroid Belt. I don't know all the details yet, but I think it's an honor to be chosen."

The delay went by. Her mother answered very late. "Why, congratulations, dear, but what's it all about?"

"I'll call when I know more, but I think it's all very secret and restricted." One, two, three.

"That's wonderful," Sharon said, sounding a bit skeptical.

"Is Dad there?" Lissa asked. One, two, three.

"I'm at the hospital, but I think you can call him at home."

"Maybe later."

"Well, I have to run," her mother said after a moment, smiling again. "Bye, dear."

The screen winked off as Lissa got up and rushed to the door. It slid open, and she went out into the corridor. She hurried to Alek's door and pressed the buzzer.

The door opened. Alek was in his bathrobe. "I was just about to shower," he said coldly.

"Can I come in?" she asked, ignoring the confusion within herself.

Alek stared at her. She started past him into the room. The knot in his robe slipped as she brushed against him. She stopped and looked up at him, feeling warm. He wasn't as tall in his bare feet. She took a deep breath as he leaned over suddenly and kissed her. She was surprised as her arms crept into his robe and locked around him. He seemed very different from the person she had been talking to only a few minutes ago. His lips were tender, giving. He put his arm around her and led her inside, brushing her cheek with kisses. "You liked me also," he said softly, "but you wouldn't admit it." His blue eyes watched her mysteriously. He seemed so friendly, so good, so knowing. How could she have ever been afraid of him?

She kissed him fiercely. A distant voice insisted that she was losing herself, but she was unafraid, sure that the voice was wrong. Alek was beautiful, and he would also be her best friend.

Later, she sighed gently and watched his face. His eyes were closed, and he seemed to be looking deeply into himself. She felt his glow, and her own.

"You make me very happy," he said after a moment.

"Same here," she whispered as he turned on his back next to her.

"Why were you afraid of me?" he asked after a silence.

She tensed slightly. "I guess I was afraid that falling in love would distract me from my studies."

"And do you still think that?"

Her skin was beginning to cool. "I don't know," she heard herself say, "and right now I don't much care."

She felt his hand in hers, and turned to see his strangeness next to her own. What are we, she wondered.

It was all set to be this way, long ago, and she was glad. Then she laughed and kissed him again, deeply and for a long time, remembering that once her mother had told her that people existed to make each other happy, but that too many of them forgot that by the time they grew up.

She woke up and heard the shower running. Alek was bathing. She listened to the water. Her mind was clear—and different; it seemed to her that she had been dreaming. Making love to Alek had been a dance of some kind, something that had to happen. She stretched, feeling rested and tingly.

The shower stopped, and an unhappy thought pushed into her mind. If it didn't work out between Alek and her, then she would be able to leave at term's end; she had a way out.

"Hello," he said as he came out with a towel around his waist.

She smiled as he sat down and touched her stomach again. Why spoil these moments by telling him? But as she looked at him, she realized that he would probably not be able to go with her when she left, even if he wanted to; she would probably not see him for a long time, perhaps never again.

"What is it, beautiful?" he asked.

She bit her lower lip, enjoying the sound of his voice as he touched her. Her eyes closed, and she was grateful that for tonight, at least, she would not have to think of anything. She would listen to Alek, to the sound of his breathing as he lay beside her, to his happiness at having found her. They belonged together. It was as simple as that.

A week later, as she was studying a cybernetics problem on her screen, Lissa realized Alek was no trouble at all. It was pleasant to know that he was down the hall and studying as she was. What had she been afraid of? Another person had felt those fears. Now she was able to breeze through her day's reading and problem solving. She still felt a bit guilty about not telling Alek where she was going next term, but that was still too far away to worry about. There would be plenty of time to work out something.

[|Go to Table of Contents](#) |

9

"So you're going to leave us dummies behind," Alek said. "Well, I knew you were smart." They were walking down the trail to the village, stopping occasionally to enjoy the clear view of the valley. Alek seemed very sad as he looked at her. "Who else is going?"

"Just Susan Falleta, I think," Lissa said.

He sat down on a rock and sighed. "Well, I guess I'll just get my degree and go home to Australia." He seemed so ready to give up that she wondered if he'd had any ambitions at all.

"What will you do?" she asked.

He looked at her, half smiling. "Well, I can't bloody well come with you!"

"Why not?" Lissa demanded, startled by his outburst.

"What would I do, Lis?" he asked more softly.

"You could try to find out."

He shook his head and pretended to check his left boot. "It's a special place you're going to. No one really knows what they're doing there or what kind of people they need. You have to be asked."

"I could ask Dr. Shastri, she said, sitting down next to him.

"No, don't! It's bad enough that I wasn't asked."

"Well, they didn't ask most of the others, either," she said.

"They're upset, too, especially Louis." He got up, picked up a small stone, and threw it out into the valley. "No one ever told us they'd be making selections before the three years were up. I thought we'd be together for at least that long."

"I'm sorry," Lissa said.

"It's not your fault."

"It is, partly. I should have left you alone. I stole your independence."

He sat down again and put his arm around her. "No, Lis, I wouldn't have missed you for anything. Just bad luck."

She looked at him. "Do you really mean that?"

He smiled, trying not to look sad. "You know I do."

She was silent. "So what are we going to do?" she asked finally.

"I don't know. I really don't know."

Lissa came into the dining room on the afternoon of the next day, hoping to get a strong cup of tea from the cook. Louis Tyrmand was sitting alone at the table, looking very glum.

"Is that tea you're drinking?" Lissa asked, sitting down in an empty chair.

He looked up at her and nodded. She smiled.

"So you're going," he said bitterly, avoiding her eyes.

Lissa felt puzzled. "What's wrong with that?"

Louis looked directly at her. "You're the success here, you and Susan. Why should any of the rest of us bother? We're not going to get anywhere. I'm leaving as soon as possible."

"What?" she said with surprise. "But you've still got two years left!"

"No—I won't get anywhere here. Might as well go where I can succeed."

Lissa swallowed nervously. She'd had no idea it was this bad. "I think you're interpreting this all wrong. Susan and I will still have to finish our three-year studies, the same as if we were here. Neither of us knows what Dr. Shastri expects from us, but whatever it is, we may fail at it."

Louis shook his head in denial. "No, no, Shastri knows what he's doing. It's over for those who stay behind. We'll be the second-raters." He sipped his tea and stared down into his mug.

"Look, if you think I'm so smart," Lissa said, trying to jar him out of his mood, "then you should believe

me when I say you're wrong. You just can't give up now.

"You're just saying that to be nice."

"I'm not, Louis, really I'm not." He was much worse than Alek had conveyed. "You can't let feeling sorry for yourself get in the way. My going is no judgment on the rest of you."

"Please leave me alone."

Lissa felt angry. "Louis, you'll be a real second-rater if you do this."

"Thanks, but I can tell which way the wind is blowing around here. The rest of us feel the same way."

Suddenly she wondered what Dr. Shastri was doing. There would be no class left, except for Susan and herself. It seemed cruel.

"He'll get new students, eventually," Louis continued, "and he'll thin them out also. Maybe it's even the right thing to do."

"But you can still get an education."

"That's not all we came here for. If we can't get close to the cutting edge of this project's work, then it's time to do something else. Don't you see? I think Shastri's judgment may be right."

Lissa got up slowly. Coming here must not have meant that much to Louis to begin with, she thought as she left the dining room.

Dr. Shastri gave Lissa a glowing evaluation report at the end of the first term, but this was overshadowed by her preparations to leave for the Institute's field station in the asteroids.

"I'll write a lot," she promised, trying to dispel the farewells in Alek's eyes.

"So will I," he said, touching her cheek.

She had asked Dr. Shastri about him in private, but he had told her there could be no personal visits to the asteroid. The workers and students there were a devoted group.

"You could refuse to go," Dr. Shastri had offered, "for personal reasons. We would hate to lose you."

"Oh, no, I couldn't do that. I'm definitely going."

"You will forgive me," Dr. Shastri had said, "but I would rather not know more about your dilemma. My concern is to get the best minds I can find, and if I know too much about their personal difficulties, I become distrustful. I've grown old enough to know that some things get done only because of sacrifice and dedication, and I accept that as surely as I do the gift of life."

"What will I be given to do?" Lissa had asked.

"You will be apprenticed to the team working on the tachyon receiver-transmitter, and you will continue your schooling. In time, we hope, you will take over one of the positions of the scientific workers who have to leave or who can't carry on for one reason or another. And it's hoped that you will develop your own lines of inquiry." He had looked at her carefully, as if searching for signs of weakness. "And how do your parents view this new road for you?"

"They think it's fine, if that's what I want."

"And you're sure that you do?"

"Yes, I am," Lissa had said with all the sincerity she could muster.

Dr. Shastri had smiled. "I see that you are. I've also spoken with your mother and father, and they tell me it's the kind of thing you dreamed about."

"Yes."

"But your young man—will there be time for him?"

The question had embarrassed her. "I don't know. What can I do? I don't know when I'll be coming back."

"You can come back whenever possible, but we choose people for their commitment. It may be a few years. We don't know where our new research may lead."

"I don't think I'd want to leave," Lissa had said, feeling guilty.

She touched Alek's cheek with her palm. He got up and paced his room. She sat back on his bunk and rested against the wall.

He said, "I'll survive. We haven't known each other that long."

It hurt her to see him trying to break away.

"Go and don't worry about me," he said. He stopped and looked at her carefully. "You'd better, because I won't let you stay. I mean it, I won't let you."

A part of her was glad that he was helping her make the decision; alone, she might have decided to stay and been regretful for the rest of her life.

"Right?" Alek demanded through a lump in his throat.

She nodded. "But I love you anyway."

He sat down next to her. "I know, but we're just going to have to wait and see what happens."

Her phone was ringing when she got back to her room. She sat down at the desk and opened the channel.

Her father smiled at her. "Hello, Lissa."

"Hi, Dad, she said listlessly. One, two, three.

"Why so glum? Dr. Shastri told me about your being selected for the remote station. Congratulations. You do want to go, don't you?"

She wasn't going to talk about Alek. It would be too embarrassing to admit that she had fallen in love after years of claiming that she was immune. Strange, Alek wasn't just a boy, she thought. He was Alek, a person inside a male body. Alek.

"Lissa, are you there?"

She nodded. "Yes, I'll be going." One, two, three.

"I've never seen you so subdued."

"I'm just disoriented a bit by the idea that I'll be leaving this place. It was a surprise."

"I understand," Morey said after the pause, but he sounded a bit wary. "How will you be going?"

"A ship will be leaving from High Earth Orbit at the end of the term. Only personal baggage allowed. They'll supply all I need there. We'll stop around Mars, then make the final short run to the remote station. It's a small asteroid hollow." She waited, smiling at him.

"Are you excited?"

"Sure am." One, two, three.

"You still don't sound like you want to go."

"I do," she insisted. And I don't, she thought. "I do," she repeated, wishing again that Alek could go.

"Okay, okay. I'll call again before you leave. Got to make a meeting. 'Bye!'"

As the screen faded, she realized that if she refused to go, her life up to now would be over, her dreams destroyed. For a moment she resented Alek's existence, but then she softened. It wasn't his fault; just bad luck. At least they would have a few more weeks together.

During Lissa's last dinner at the Institute, Louis got up suddenly and proposed a toast. Everyone was there, including Dr. Shastri and the two tutors, Melvin Rood and Stewart Cheney.

"This is for Lissa and Susan," Louis said. "We're happy for you and wish you luck."

Lissa saw that Alek was smiling at her as they all sipped their wine. There seemed to be no trace of sadness left in his face.

"And we want you to know," Louis continued as he sat down, "that we'll all be staying here to finish our degrees."

Lissa glanced at Dr. Shastri, but there was no clue in his expression that he had intervened. Clearly, Louis and the others now understood Dr. Shastri's decision to send Susan and herself to the remote station. The decision was not a judgment on those who would stay behind. Lissa knew that she was going as a student, not as a major player in the project.

The waiter brought out another bottle, and even the chef came out to have a glass.

Louis cleared up the mystery about his change of heart. "In case you're wondering, this kind of panic apparently strikes every class," he said, "when students are sent off to one of the branches. Melvin and Stewart told us about it and I felt silly. We might be going elsewhere also, one day, and we'll be in touch with whatever Lissa and Susan will be doing through the screen room. Big things may be happening, and we'll all be needed."

"Quite correct," Dr. Shastri said from the head of the table. "None of you were accepted here lightly, simply to be thrown away in a few months."

"I guess we're all touchy types," Emily said.

Louis was enjoying his second glass of wine. Cyril and Maxwell seemed dubious of what he had said, but they both smiled when Lissa caught their attention.

"Thank you all," she said.

Alek still had a faint smile on his lips. Lissa couldn't tell what he was thinking, but he seemed confident.

[Go to Table of Contents](#) |

10

Lissa flew to meet her parents in New York City for the Christmas holidays, which came during the same week as the Institute's endterm break. The suborbital ascent and glide path took her over the Pacific and the southern United States. She spent the seventy minutes thinking about Alek.

He had grown quieter as the time for her departure had drawn closer.

"It's as if someone were dying," he had said, "and there's nothing we can do about it."

She had felt the same, especially when the copter had come to pick her up, but she had tried not to let Alek see it.

"You have to go," he had said. "A part of you is happy, at least." "Try to be happy with me, Alek, please!" she had shouted over the sound of the blades.

They had kissed, but the tension tore them apart. "I'm so sorry," she had whispered, and he had hugged her tighter. *This can't be happening*, she had thought as she was lifted and carried away from the old monastery, out over the early morning mists of the valley. She had not looked back, because she didn't want to see Alek waving good-bye.

She closed her eyes now, and it seemed that he was about to kiss her, to hold her, and that they would swim gently in each other's arms . . .

She opened her eyes. The New York International runway was rushing past her window. The steward, she noticed, had locked her seat belt for her. The city stood with its glittering towers, many of them more than a century old, defying the night. Two levels stood above the old street level of the twentieth century, and twenty more levels were cut in the bedrock of Manhattan Island.

The plane slowed and taxied in the brightly lit evening, and finally slipped into the terminal.

As she came out into the waiting area, saw her parents standing together. A nice couple, she thought as they spotted her and waved. She hurried toward them, adjusting her shoulder bag and trying to look cheerful.

"Lissa!" her father exclaimed as he hugged her to him.

Her mother kissed her on the cheek.

"We've got a cab outside," Morey said, leading the way.

"Glad to be here, dear?" Sharon asked.

Lissa smiled at her and nodded.

"We thought we might not get to see you for the holidays," her father said.

They came out of the terminal and got into an automatic cab. It started slowly, then shot away, its

hydrogen-powered engine grumbling softly.

"We've got theater tickets," her father said, "dinner tickets, and fireworks in Central Park." He sounded very excited. "I haven't been back here in nearly a decade." He became silent, staring out at the lights. Lissa could almost hear him thinking about how he had grown up here, gone to high school, and made friends with Joe Sorby, and how the two of them had gone out to Bernal One to attend college.

"I wonder how Joe and Rosalie are doing," he said, looking up at the hazy, star-filled sky through the cab's sunroof. The starship on which they had shipped out was not due back for still another decade. Most of the communications from the vessel were old by the time they reached Earth. Lissa felt that Morey missed his old friend more than he cared to admit. Twenty years or more would separate them by the time Earth's first starship came home, but in that time the people on board would have aged more slowly than those at home, since bioclocks ran slower as they approached light speed. "Well, Merry Christmas to them," Morey said, "wherever they are."

The cab bulleted toward the million lights of the city, penetrated to the street level at 53rd Street, and pulled into the Hilton receiving area. Morey put his thumb to the fare credit plate and the doors opened.

"Here we are," he said, "and we're going to have a great time!"

A letter was waiting for Lissa when she came into her room just across the hall from where her parents were staying. She sat down at the screen and touched her palm to the code-credit plate, wondering why Alek had not simply called as his note came up on the display:

DEAR LISSA,

I WANTED YOU TO HAVE THIS NOTE BY THE TIME YOU GOT TO THE HOTEL, SO YOU WOULDN'T WORRY. IF THIS IS ALL WE'RE EVER GOING TO HAVE, I WOULDN'T HAVE MISSED IT FOR THE WORLD. BUT IF WE KEEP IN TOUCH AFTER SOME TIME, AND STILL WANT EACH OTHER, THEN THERE WILL JUST HAVE TO BE A WAY. IN ANY CASE, WE'LL HAVE TIME TO THINK (AN ACTIVITY I KNOW IS VERY IMPORTANT TO YOU!). WHENEVER I THINK ABOUT YOU, IT ALWAYS COMES UP *I LOVE YOU* .

—ALEK

The screen flashed some authorization numbers and the time when the letter had gone out and from where, then winked off.

Lissa smiled, feeling a warm glow, as if some distant song were playing deep inside her. She would do what Alek wanted her to do—study and grow into her work. He knew what she had always wanted, and that made him special, no matter how far away he would be from her.

The giant 3-D figure of Julius Caesar stood above Central Park, waiting for the knives of the Roman senators to pierce him. Lissa closed her eyes as the holo of the titanic figure was struck down. Caesar cried out, reproached Brutus, then finally accepted his fate.

"A bit bloody," Lissa's mother said next to her.

Lissa opened her eyes. Caesar lay like a white whale among the trees. Behind him, New York towered into the sky, slender pyramids and 200-story columns thrusting up beyond the horizontal levels. Stars twinkled, but she had to look directly upward to see them. Soon, she thought, I'll be out there, on my way to Mars.

She watched the rest of the play in a kind of dream. Shakespeare often had that effect on her. The

fireworks came on at the end, but she was too preoccupied to ooh and aah with the crowd. She wanted to run her life in fast forward, to find out how it would all turn out.

Late that night, as Lissa was preparing for sleep, there was a soft knock at her door. She opened it.

"Can I come in?" her mother asked.

"Sure."

Sharon came in and sat down in one of the two arm chairs. "I know you miss him," she said. "I see all the usual signs. No, I won't discuss it with Morey if you don't want me to, but I thought it might help to talk to me." Lissa smiled as she got over her surprise. "I guess I'm pretty obvious about it."

Sharon smiled. "Not to everyone, just to me. How much do you care about—"

"His name's Alek Calder, Mom. This isn't like Henry Baum, believe me." She heard her voice tremble, and a panicky jolt entered her stomach.

"Maybe it'll wear off. Give yourself some time."

The jolt came again. "No! I could never forget Alek."

Her mother nodded. "You'd be surprised what you can forget."

"Could you forget Dad?"

Sharon smiled wistfully. "No, but he was a special case. I had to chase him. He didn't even guess that I was interested until . . . well, he had his doctorate by the time he fell in love for the first time."

"Really? That long?"

"He was very dedicated to his work. Still is."

"So am I," Lissa said defensively. "I'm going, no matter what." She knew that Alek would want her to say that.

"It'll work out in the long run," her mother replied, "if there's anything there. I know it sounds stupid to say general things like that."

Lissa smiled, feeling very tender toward her. "Life is like that, huh?"

They both laughed, but Lissa felt a great sense of danger as she tried to get to sleep that night. She didn't know what she feared more—that she might never see Alek again, or that she would forget him.

[|Go to Table of Contents |](#)

11

On New Year's Day, Lissa's parents put her aboard the New York-to-Brazil air shuttle. From the Clarke Equatorial Spaceport she would boost to the interplanetary terminal complex in High Earth Orbit.

"Morey," her mother said, "we won't see her for over a year."

Her father looked shaken, but he tried to remain composed as Lissa kissed him. "Take good care of yourself," he said in a weak voice. "You may be the best brains in the family." Lissa hugged him around

the middle and turned to her mother.

Sharon was weeping.

"It won't be so bad," Lissa said. "As soon as you're back in the hospital you won't even know I'm gone."

They embraced and held each other for a few moments. Then Lissa turned away quickly and marched through the long tunnel that led into the shuttle. She stopped at the end and glanced back, but there was no one there. They were hurrying to make their connection for the Bahamas, where they would meet two sets of parents: Morey's and Sharon's.

She entered the air shuttle and took a seat halfway down the aisle, putting her shoulder bag on the outer seat in the hope that no one would sit there.

The shuttle climbed until the sky became a cloudless deep blue. One hundred and ten kilometers up the engines shut down, and the craft began its effortless glide south. Lissa unhitched her belt and put her feet up on the empty seat, enjoying the calm whisper of the ship toward the equator.

She closed her eyes for a few moments and soared inwardly; when she opened them, stars shone in the purple-black over Africa's curving horizon. I'm really going home, she thought, thinking of all the people who lived in Earth's sky—on the Moon, around Mercury, on Mars and in the Asteroid Belt, and on the moons of Jupiter and Saturn; two and a half million in her own Bernal Clusters alone, twice that many in the O'Neill Cylinders of Sun Orbit. A starship was making its way somewhere between Sunspace and the triple star system of Centauri, 4.3 light-years away. Everywhere, human beings were transforming, building, and seeking worlds. And somewhere, beyond the worlds of human experience, were the Others, waiting to be understood....

Clouds covered the small screen when she woke up. The big screen at the head of the aisle flashed:

JANUARY 1, 2081

2:17 P.M.

ETA 2:25 P.M.

She sat up and watched the descent. The shuttle dropped through the clouds into sunlight. Blue-green jungle covered the Earth. Clarke Equatorial Spaceport was just ahead. Lissa fastened her seat belt before the sign flashed.

The spaceport ahead consisted of square after square of cleared land covered with buildings, hangars, roads, walkways, hotels, launchpads, and communications dishes. Earth's spin was fastest here on the equator—1,600 kilometers per hour—so even the most advanced launch vehicle gained some extra push into orbit.

The air shuttle came down fast. Lissa tensed as it touched the runway and began to slow. As she waited, she realized that she had become used to the Earth. Leaving it reminded her again that she was leaving Alek behind, but she pushed the fact aside as the shuttle came to a gentle stop.

She shouldered her bag and went down the aisle to the exit. A long tunnel brought her to the passport check, where she slid her card into the slot and pressed her palm down on the ID scanner. Her card popped back; she took it and went out into the terminal.

Here was a great floor filled with people coming and going from all parts of Sunspace. Many stood by their luggage and were well dressed; others looked poorer and rougher. Some had children with them. But as she looked at faces that were happy, glum, even loutish, Lissa realized that Earth was the great

giver of people. This was the world from which humanity had started, and it was the world that would keep on giving people for many decades to come. It would be a long time before offworld populations would equal Earth's billions.

Sun, sky, and a bit of jungle were visible through the giant dome. The rain forest of the Amazon was a crucial part of Earth's recovering ecosystem, she knew, but suddenly the fact of all that green wilderness filled her with awe.

A 3-D ad flashed in her eyes:

ORBITAL TOURS!
SIGN UP NOW!

She blinked and looked away. Other signs proclaimed the advantages of shipping out as a technical apprentice to a dozen points in Sunspace. Some of the signs were shabby and ill maintained, showing holos of power satellites beaming energy down to Earth, close-ups of robots and space-suited human workers, as well as interiors of grand orbital spas and hotels.

"Now boarding!" a woman's voice boomed. "High Earth Orbit shuttle 714. Gate Six!"

A giant sign flashed over the entrance on the far side of the waiting area. Lissa hurried across the giant floor, but paused for a few moments to read the inscription on the monument at the center:

EQUATORIAL SPACEPORT 1
OPEN FOR THE PEOPLE OF THE EARTH
2002
THE STEEL IN THIS MEMORIAL WAS MANUFACTURED
OUT OF ORES MINED FROM THE FIRST ASTEROID
BROUGHT INTO EARTH ORBIT
2018

Those dates seem so long ago, she thought as she hurried on toward her boarding gate.

There was a line at Gate Six, but finally she boarded the tube car. It slid forward and shot into darkness, carrying her to the launchpad two and a half kilometers away.

The lift took her up through the center of the orbiter and let her off at seat twenty-five, more than a third of the way to the ship's nose. She climbed into her seat and watched the lift drop away, then fastened her seat belt before the sign flashed on the overhead screen. A male voice repeated the instruction.

The screen lit up, showing the orbiter standing under a blue sky. She had never taken a gravitic ship, but from what she knew it was different from a nuclear pulser. Grav launchers were still much more expensive in power requirements, but they were slowly replacing the older designs.

She heard a whining sound.

"Gravity inside the ship," a woman's voice explained, "will increase to about five times normal. Then the ship will be released by the reversing field, at which time you will become weightless. Please turn off the view screen if you find takeoffs distressing. Thank you."

The high-pitched whine grew louder. Vast amounts of power, she knew, were rushing in to sustain the reverse g-force. Her seat adjusted to face the screen, and she felt her body pushing back into the cushions.

The blue sky seemed to flow on the screen. She felt a moment of anxiety as the ship was hurled upward. It seemed to dive down into the blue as the invisible cone of negative gravity pushed the vessel away from Earth. She was falling as the ship climbed. The launcher on the ground was screaming after its lost craft. 3-Ds of Brazil and a sparkling ocean flashed up on the screen, followed by the glowing curve of the planet's horizon and the stars beyond. She was swimming out of an ocean of air into a lighted Sunspace, drifting weightlessly against her strap, waiting for her stomach to calm. All of South America was coming into view. Alek was on the other side of the globe, hidden in the furrows of the Himalayas. The sudden thought of him there, in those ancient wrinkles, filled her with regret.

Lissa awoke. The asteroid hollow in High Earth Orbit was on the screen, looking like a huge potato roasting in the sun. She looked carefully and saw dozens of black caves, where the big solar-system ships docked for repairs and service, and to take on passengers, supplies, and cargo. Inside the asteroid's hollow were hotels, stores, warehouses, labs, and clinics. The place had been made from the first asteroid that had been maneuvered into Earth Orbit for mining in 2018. When those operations had exhausted the ores, the huge rock became a vital way station.

The shuttle turned toward one of the cavelike openings and made its approach. The opening grew larger, until Lissa could see inside. The dock was much larger than the ship. Lights blinked on as the shuttle floated inside and was secured.

Lissa waited for a few moments, then slipped her bag over her shoulder and floated out into the passageway, which was now a zero-g corridor. She saw a few of the other passengers floating toward the tail exit. She pulled herself along, wondering if she would have a chance to see the High Orbit hollow before making her connection with the Mars ship.

"There you are!" Dr. Shastri shouted as she floated out into the receiving area.

"Dr. Shastri, what are you doing here?"

"I'll be traveling with you. We've got to hurry. The ship is on a tight schedule. No stopovers, I'm afraid."

He motioned to the nearest empty tube car. She strapped in next to him, feeling disappointed that she would not be able to explore the great interplanetary terminal. She looked around anxiously, taking in the spherical reception area, from which tubeways led in all directions. The brightly lit space was filled with floating passengers making their way to waiting vehicles.

"The ship is being held for us," Dr. Shastri said as the open tube car shot into the tunnel. "We're the last ones to load."

"Why the hurry?" Lissa asked.

"Important things are happening. We must get to the remote station by a certain time."

"Why, what's happened?"

"Yes, yes, you'll learn shortly."

"There's been a breakthrough!" she said, her mind racing. Something new, after all these years! The signal had been decoded and understood, and she had not helped make it happen. "What does it say?" she demanded, feeling both elation and some disappointment.

Dr. Shastri shook his head. "It's not that. Other things. Please be patient."

The car glided into another receiving area. Lissa glimpsed the Mars ship through a large transparent

partition. The vessel was a 300-meter-long cylinder with large globes at each end. It floated in its cradle, lit up by the glare of white lights.

"It's a middle-aged torchship," Dr. Shastri said, "but it's been completely overhauled. Another will follow us in a week or two with a team of mechanics and maintenance workers. We're recruiting them now."

"What's going on?" Lissa asked as they waited to board the ship.

Dr. Shastri smiled. "Not until we leave. Ask me then."

She was glad to be excited and curious, but she felt a bit guilty. Worrying about Alek was a small, petty thing compared to what Dr. Shastri might reveal to her. But Alek would want her to be excited, she told herself silently as the car glided into the ship.

Her cabin was on deck four. She stowed her bag and strapped down on the bunk. As she waited for acceleration to start, she tried to rid herself of all self-pity. She was fortunate enough to be part of a great cultural and scientific adventure, one in which some kind of progress was being made at this very moment, despite the critics.

The small screen above her bunk lit up, showing the open way that led out of the asteroid. Stars shone in the circle of blackness. Slowly, the ship stirred, and she felt the nudge of acceleration pressing her gently into the bunk.

The circle of starry blackness expanded, and suddenly the ship escaped into the sea of space. She imagined a whale carrying her to Mars. For most of a week she would live inside its body.

Her weight increased, and finally the green light went on over the screen, signaling that one-g was now steady. All the ship's decks now had a normal press of simulated gravity, due to the ship's constant acceleration. The sense of weight would remain the same even though velocity would continue to increase. The nuclear torch could push the ship to velocities of over 200,000 meters per second. Other ships were even faster, she knew, but it was this kind of ship that had made the solar system smaller, in travel time, than the Renaissance Earth of Columbus.

She unstrapped, got up from the bunk, and looked around. The cabin was some three meters square. The walls and floor were made of ceramic. Besides the bunk, there were a half dozen drawers in one wall, a fold-down desk with screen and keyboard, phone included. A slide door led into a small bath-shower and toilet. A small overhead grill let in fresh air from the ship's recycler. It was certainly not a luxury liner, she thought as she looked around at the green decor.

She sat down on the bunk, feeling strangely disappointed and suspicious about what she was getting herself into. After a moment she got up, opened the folding desk, and punched in a call to Earth, hoping to catch Alek in his room.

The screen lit up:

SECURITY RESTRICTION

She tried again, but all outgoing calls were blocked.

Her door buzzed.

"Come in," she said, feeling annoyed.

The door slid open. "May I come in?" Dr. Shastri asked.

She nodded. "Why are the phones restricted?"

"Whom did you wish to call?"

"Alek Calder."

"I'm afraid you won't be able to call anyone, and I regret the necessity. But let me explain."

She retreated to the bunk. He sat down at the desk.

"I'm sure you will understand," he began. "U.N. Earth Authority is keeping this all under wraps. You see, we've now deciphered part of the alien message. At least we think so." He paused.

"And?" Lissa asked. "What does it say?"

"It's a picture—more of a diagram—of our Sunspace, showing the Opik-Oort halo of comets that surrounds our solar system. The diagram seems to suggest that when the halo of cometary material is disturbed, then thousands, perhaps millions of comets may plunge into the inner solar system. It would take only a few to devastate the Earth. As you know, this influx from the Oort Cloud has occurred in the past, roughly once every thirty million years. The mass extinctions recorded in geologic rock strata suggest this."

Lissa felt a twinge of fear. "Do you think the signal is warning us that the danger is coming *soon*?"

"Perhaps," Dr. Shastri said with a sigh. "But if it comes, there may be little we can do about it. There may be as many as a hundred billion comets and asteroids in the Opik-Oort Cloud. We might deflect a few, even several at a time, but not a swarm. The next two centuries may pose a threat to our whole Sunspace civilization. Earth may not survive. The free habitats have the best chance, of course, but most of Earth's billions of people would perish."

Lissa was silent, unable to imagine the end of all human history. It seemed impossible that it could happen.

"And you think we're actually being warned?" she asked.

"We can't be absolutely certain, of course, but it seems so. And it appears we know the source of the signal. The coordinates lie in the outer solar system, where there doesn't seem to be anything on the visual wavelengths."

Lissa felt a twist in her thinking. She wanted to probe all the possibilities. "But why is the signal's origin so near?"

"So that it would reach us quickly, given the slowness of radio waves. Maybe they had to be sure that we would receive the warning, given that we haven't yet shown that we can send or receive tachyons."

Lissa's mind seized a conclusion. "Radio—perhaps they're also trying to be *discreet*, by sending a signal that only we would notice. It wouldn't travel far in the time we've been receiving it. Radio is probably no more advanced than jungle drums to an advanced civilization, so they wouldn't notice someone trying to talk to us in that way."

"You may be right. Perhaps someone is not supposed to give us a warning, but they wanted to do it." Dr. Shastri smiled. "It's still all guesswork, of course. I wonder who they might be, and how distant is their home world? The signal source may be only a relay."

"One alien power doesn't want us to be contacted," Lissa said, "while another is doing it. I wonder why they care, either way?"

Dr. Shastri looked at her knowingly, and again Lissa knew what to say. It was almost as if she were remembering it, listening to some lost memory. "Well, I guess now's the time to go out and find the source of the signal, given that we know where it is."

Dr. Shastri nodded. "We'll be taking the remote station out there to do just that, and work will continue on the tachyon receiver-transmitter as we go. It'll be a long journey, and we'll be out there for months. Perhaps if we find the source of the signal, we'll learn something useful to our survival. It's better than spending the coming decades watching for incoming cometary bodies."

"But they may not come for centuries, even thousands of years. We'll have time to prepare."

"True. Or they may have already come, and this is an old warning. We don't know on what time scale the nurturers, if we may call them that, are trying to warn us. Centuries may be only moments to them. We'll have to go out and learn what we can."

"How many people are going?" she asked.

"There are already some four hundred people inside the small hollow asteroid. More are on the way on this and other ships. We've tried to pick a cross section of the best student and professional minds." He looked at her intently. "You will be given a chance to go home if you change your mind before we move the station into its outward course. You'll be asked to keep silent. As far as anyone knows, the asteroid is leaving on a routine exploratory mission into the outer solar system. Nothing of our suspicions must get out until we know more. Now, if you'll excuse me, I have to go tell your colleague, Susan Falleta, what I have told you."

"Susan's aboard?" Lissa asked, feeling glad.

"Yes, she just made it." He stood up, the door opened, and he was gone.

Lissa leaned back in the bunk and imagined what was going to happen. She reached out mentally and saw the great darkness of outer Sunspace, where the Sun was only a bright star, where countless dark worlds circled the Sun in slow orbits. The cometary halo was a great reef around the solar system, the last barrier before the ocean of interstellar space.

Something had put a transmitter out there, to whisper a warning across the short radio distance to the islands of life that were the inner planets. That someone or something had chosen radio to conceal its act of mercy. Radio was enough for such a short astronomical distance, ensuring that the signal would be noticed by a civilization that as yet had no other means of communicating across light-years.

Another idea came to her, like a friend with a warning. If this was all true, she thought, then something out in the galaxy may not like us, while something else thinks enough of us to want to help. And this was probably the first time in human history that a warning of this kind had not fallen on deaf ears.

[|Go to Table of Contents |](#)

12

"Of course, this may only be a routine warning," Dr. Shastri said as they ate dinner at the Captain's table. "We know that the solar system has to weather passage through the clouds of the galactic disk, which may be enough to slow up comets in the halo and send them Sunward. This signal may be a normal storm

warning set up wherever a solar system seems to be harboring a young civilization."

"I can't quite accept such thoughtfulness," Captain Ruark said gruffly.

Lissa ate her food slowly. Susan Falleta sat across from her. Dr. Shastri sat across from the Captain. Jerry Dubin, the First Officer, sat at Lissa's right. Whenever she glanced at him, he smiled playfully, annoying her. Susan gave her an occasional look of sympathy.

"You're claiming, Doctor," Dubin said, "that billions of Earthly creatures perished in these cometary strikes?"

Dr. Shastri nodded. "It seemed to happen once every thirty million years or so."

"Then what have we to worry about?" Dubin asked.

"This is probably the first time Earth has held a civilization capable of understanding this form of catastrophe," Dr. Shastri replied. "It's possible that a passing body, a dark star or something else, can also affect the cometary halo. Maybe it already has, and disaster lies only decades ahead. We must find out what kind of danger we are being warned about, if possible."

"I see what you mean," Captain Ruark said soberly. "We may be entering a cloud that will affect the orbits of the comets in our halo."

"Or a black dwarf, a brown dwarf, even a black hole, might have sideswiped the halo. It doesn't take much to shake it. Imagine a Christmas tree—anything can shake a bauble loose. Even a small change in a comet's orbital velocity may be enough to send it Sunward."

"But fortunately it will take years for a comet to reach the inner solar system," the Captain said.

"I'll bet it's an old signal," Dubin added, staring at Lissa. "Nothing's going to happen."

"We have to make sure," Susan said firmly.

"Young man," Dr. Shastri continued, "the Earth and Moon are peppered with large asteroid strikes. Earth doesn't show it because of weathering and erosion, and for most of our history we didn't know enough to notice. But look at the Moon. Luna is our memory. Now imagine literally millions of bodies coming into the inner solar system. We would have no defense. Even if this might happen centuries from now, that would not be enough time to prepare to deflect each object."

"What if it's ten thousand years or more from now?" Dubin asked.

"It would still be worth knowing *accurately* what the danger would be, and such knowledge would have to be passed down from civilization to civilization."

"Ten thousand years from now we'll be out among the stars," Dubin said. "Earth will be worn out. We'll have mobile habitats and new worlds to settle."

"Don't you understand?" Lissa demanded, glaring at him. "The danger may be nearer than that, and words won't decide what's true!" He stared back at her, trying to make her angry. She looked away.

"That'll be enough, Dubin," the Captain said. "Our job is to get these people where they need to go and maintain security."

"Yes, sir."

After dinner, Lissa relaxed in her bunk, listening to the distant drone of the ship and the white noise of the air ventilation. She knew that the ship's path to Mars would be pretty nearly a straight line. Torch ships didn't have to drift in unpowered orbits, counting on the momentum of an initial boost to bring them to their destination, as had the ships of the last century. A continuous nuclear torch could boost in time to meet, or even catch up with, a planet in its orbit. Halfway to Mars the R-20—the vessel had only a number, she had learned—would begin to decelerate, until the ship's velocity was just enough to let it fall into an orbit around Mars. From there it would maneuver into the Phobos docks.

Lissa's door buzzed. "Come in," she said, then sat up nervously, afraid for a moment that it might be Dubin.

Susan came in. "May I visit?"

"Sure," Lissa said, making room for her at the other end of the bunk.

"I want us to be better friends than we were back on Earth."

"I'd like that," Lissa replied, smiling.

Susan sat cross-legged on the bunk. "That officer, Dubin—he came to my cabin a few minutes ago."

Lissa nodded. "I almost thought he'd come to annoy me"

"He's right out of the Stone Age, isn't he?"

"Sure is."

"Not bad-looking. Just so sure of himself he can't imagine everyone doesn't see it. How old do you think he is?"

"Late twenties," Lissa said. "But let's not waste breath on him."

Susan grimaced. "I agree. Are you glad you came?"

"I think so."

Susan looked at her carefully. "You miss Alek, don't you? And you still wonder what happened to you with him, don't you?"

"A little," Lissa said, feeling a flush in her face.

"Don't worry, it doesn't show. You were all he would ever talk about, especially when he thought it was hopeless that you'd like him."

"Really?"

Susan smiled wistfully. "I was just a stand-in for you."

Lissa felt a twinge of concern for the dark-haired girl. "Were you hurt badly?"

Susan shrugged. "Only a little. He was kind. I got over it. But it's going to be tough on you."

Lissa sighed. "I don't know. Maybe I'll feel differently in a month, maybe I won't."

"You can send cleared letters, I think."

"I don't want anyone reading my letters."

"I think Dr. Shastri understands more about your problem than you think."

"Does he have anyone?" Lissa asked.

"If he does, it's very private. I've never been able to find out, not even in the official bio references."

"Do you think Alek ever wanted to come to the Institute?" Lissa asked.

Susan wrinkled her nose. "I don't know. He never mentioned it. He's smart enough, but I got the feeling that he might have done other things. He said he didn't like the usual colleges, even the best, so he decided to try something different, even if he didn't know how he would fit in. Maybe I didn't understand him, but that's what I think he said."

"You learned more than I did," Lissa said sadly.

"But *loved* you," Susan whispered, looking straight into her eyes. Lissa looked away.

"Oh," Susan said after a moment. "You were never in love before. You don't mind my asking?"

"It's okay," Lissa managed to say.

"First time?"

"Not really," Lissa said vaguely, "but the first time with someone I cared about, and who cared back."

"Kid, you've got it as bad as I've ever seen. You'll need a friend, even a jealous one."

Lissa smiled. "Okay."

"I'll say this—you've got great control. I know the tears are there, but you're putting them away real well. What do you do, swallow them?"

Mars grew larger on the screen over Lissa's bunk. She read a few assigned texts and tried to relax, keeping to herself, even asking for meals to be sent to her cabin rather than endure First Officer Dubin. Susan came and ate with her sometimes.

The R-20 reached maximum speed, using up the light-minutes to the red planet. Lissa would look at the stars on her screen, imagining that each one was singing a silent song of its own. In a sense that was true. Each sun sent out the song of its spectrum, its pulsing magnitude, its own light-history. And around some of those far stars were other intelligences, singing their own histories—their hopes and fears, successes and failures.

The day arrived when Mars took up the whole screen. Phobos was just ahead as the ship drifted toward it. Lissa was in her bunk as the asteroid-sized moon came up. Mars was a giant red disk behind it, partially dark. Monorail train lines crisscrossed the surface, suggesting the canals once imagined by astronomers. Cities twinkled on the nightside, reminding her that nearly three million people lived on Mars and that the number was growing as more agridomes were built and plans went forward to terraform the desert planet. One day people would walk unprotected on the surface and breathe new air. Grass and forests would cover the land, and there would be rivers, lakes, and seas—and real Martians would go swimming.

Phobos covered Mars as the R-20 slipped into the gaping tunnel and was drawn into its dock cradle. Mars, she realized, would be especially vulnerable to strikes by comets and large meteors, since it had a

very thin atmosphere; and being more distant from the Sun, it would very likely be struck sooner than Earth. A coldness went through her as she imagined the death of a world that was still struggling to be born.

[|Go to Table of Contents |](#)

13

Dr. Shastri, Susan, and Lissa hurried to board the small tug that would take them to the Institute's remote station. A small tube car rushed them to the tug's bay, and they entered through a circular side lock. Lissa and Susan struggled to use their feet in the slight gravity of Phobos. Dr. Shastri seemed used to it, skipping gracefully off surfaces as he gave them a hand and pulled them inside.

They made their way up to the control room, where they strapped into couches near the bulkhead. The small craft had no other accommodations for passengers.

"At least we'll be able to see everything," Lissa said as she adjusted her restraints.

The pilot came in, clanking on the steel deck with his magnetic boots. He was a short man, somewhat stocky, with black hair and a day's growth of beard. Lissa took him to be in his middle thirties.

"Hello, folks, I'm Harry Lipsky," he said. "I make this pile of junk behave. Doctor, good to see you again." He sat down with his back to them, facing the screen.

The screen lit up. Harry punched in their course, and it appeared as a red diagram.

"It's all automatic," he said, "but I'm here to smooth out the rough spots and make repairs when the magic fails."

"What rough spots?" Susan asked suspiciously, looking at Lissa.

"Usually there aren't any, young lady. This tug could take you there by itself, once you put in the course. Oh, by the way, we're running a bit late. Do you mind one point one g?"

Lissa looked at Dr. Shastri, who nodded his approval.

"I guess not," she said.

"Here we go."

Lissa felt a tug. The flat screen showed a dark tunnel. The small vessel moved forward. Stars showed in the opening as she gripped the armrests and put her head back. The engines made a whining noise, and she felt vibrations in her feet, but after a moment everything quieted down.

Phobos was falling away on the screen. Mars grew behind it, and Lissa thought of a large potato falling into a red fire.

"So it's back to the old listening post, eh, Doctor?" Harry asked. "And you've got two new students."

"Yes," Dr. Shastri replied. "This is Lissa Quintana-Green-Wolfe, and Susan Falleta. Both are very talented."

"You'd have to be," Harry said without turning around. "I have two daughters down at Wells myself. That's a small town at the end of the rail line out of Marsport."

The course chart appeared on the screen again. A small green dash crawled over the red curve, showing that the tug was on course.

"How long before we arrive?" Susan asked.

"Tomorrow this time," Harry replied.

Lissa sniffed the air, picking up the odor of human sweat.

Harry's head turned slightly. "Sorry about that, but the old boat just doesn't have a way to clean itself up completely."

"It doesn't matter," Lissa said.

"We're at one point two g now. How does it feel?"

"I can't really tell," Lissa replied.

"Well, you won't have to walk around much in here."

Lissa looked over at Dr. Shastri. He was asleep.

The remote station looked very much like Phobos, except that the potato shape was only two kilometers long and a half kilometer across. It had been mined out nearly forty years ago. The Institute had bought it, sealed up the cracks, landscaped the inner surface, and put a half-g spin on it. It orbited the Sun just beyond Mars, and few people knew much about what kind of work was going on there.

Lissa noticed the large attachment at one end. It looked like a railroad car held in place by massive rings.

"That's the tachyon device," Dr. Shastri said.

The other end of the asteroid held two massive globes. Dr. Shastri did not say what these were.

Harry lined the tug up along the asteroid's long axis and came in toward the dock just below the railroad car.

"We're here," he said, sitting back as the tug crept into the tunnel. "And on time."

Lissa felt a small bump as the tug was secured inside.

"Thank you, Mr. Lipsky," Dr. Shastri said. He unstrapped and floated upright. Lissa did the same, feeling a bit queasy.

They pulled themselves down the tunnel to the lock, which was already open.

"What'd you think of Harry?" Lissa asked Susan as they floated out into another passageway. Dr. Shastri lagged behind.

"Kind of cute, in a smelly way." She laughed. "I'm glad we're out of there," she said, holding her nose.

"Keep going!" Dr. Shastri called from behind them.

The tunnel ahead was filled with yellow light. Lissa pulled herself forward on the guide rail. Her feet drifted down as she neared the end, until finally she was able to walk the rest of the way. Even though the pull was gentle, it was enough to indicate that they had moved off the central axis of the asteroid, giving the centrifugal spin a chance to work.

They came to a circular opening and looked out into the hollow. The curving landscape was very plain. Dr. Shastri caught up, and the three of them gazed out at the gently rolling grassland. It covered most of the inner surface. Barracks stood in groups of a dozen on the curving land of the small world, connected by dirt roads. A small sun mirror stood at the other end of the asteroid, two kilometers away. There were few trees.

"We'd better go," Dr. Shastri said.

Lissa stepped out first. A small vehicle of some kind was coming up the road toward them.

"It's not a large hollow," Susan said, looking at the land overhead, "but it looks much bigger than it is."

"It's comfortable-looking," Lissa said, breathing the fresh air.

"How many people are here?" Susan asked.

"With you two," Dr. Shastri said, "five hundred and two."

"A very small town," Lissa added.

The small open car pulled up to them. "Welcome back, Dr. Shastri!" a lanky young man called out from behind the wheel. He smiled at Lissa and gave Susan an appreciative look.

"This is Dr. Replier, our youngest double doctorate," Dr. Shastri said proudly. "May I present Susan Falleta and Lissa Quintana-Green-Wolfe."

"Call me Mike." He smiled and brushed his sandy blond hair out of his eyes.

"How old are you?" Susan asked, smiling back.

"He's just nineteen," Dr. Shastri said. "He also went to the Institute."

Susan was being a bit pushy, Lissa thought, but she wished her luck.

They took their places in the back of the vehicle.

"Barracks A," Dr. Shastri said as Mike turned around and drove down into the hollow.

As the air blew across her face, Lissa looked straight up. A half kilometer above her, a barracks complex was stuck to a green sky; yet it all seemed natural. Opposite points were much farther away from each other on Bernal One, but this wasn't too different. There were no clouds in the great central space. Lissa concluded that the ecological balances were still very simple here. She wouldn't even be surprised to learn that oxygen generators were needed to keep the air breathable.

Mike drove straight down the center and pulled into Barracks A. The place seemed deserted.

"We've just put this group up," he explained. "Another team will be coming in by end of next week, just before we get going."

"What are your specialties?" Lissa asked.

"Oh, I do physics and chemistry."

"He helped design the tachyon receiver," Dr. Shastri said. "And he contributed a lot to the negative-g propulsion system that is going to move us to the outer solar system."

Mike smiled at Lissa. "Neither gadget has proven itself yet, so don't be too impressed."

"We won't, for now," Susan said.

"Your rooms are over in that building," he said after a moment.

"We get rooms?" Susan asked.

"Well, small ones. These are luxury barracks. The pecking order around here goes up from maintenance engineer to student apprentice to big brains. So you're in the middle."

Dr. Shastri chuckled. "We have to go, Mike. Therefore, young ladies, please go inside and get settled."

Lissa took her shoulder bag and got out of the vehicle. Susan followed her, and together they walked up to the barracks, climbed three steps, and went in through the open door. Susan turned and watched Mike drive away with Dr. Shastri.

"He's very cute," she said, "but with my luck he already has someone."

"Don't be in such a rush, Lissa said, thinking of Alek as she went down the hallway. Her name was on the third door in.

"See you later!" Susan called.

Lissa slid the door open and stepped inside. The room was cube shaped with a large window. There were a bunk, desk, built-in closet, and small bath- toilet behind another sliding door. Everything was made out of light-and dark brown ceramic, suggesting wood but hard to the touch.

She dropped her bag down on the bunk and opened the large window, wondering whether she would need the overhead light during the day in such a sunny room. She took a deep breath, grateful for the freshness after the confinement of Harry Lipsky's tug.

She sat down at the desk and touched her palm to the ID plate. The upright screen lit up:

WELCOME, LISSA. DO YOU STILL WISH TO USE WORD DISPLAY, OR WOULD YOU NOW PREFER A VOICE?

—AUGIE

She laughed. Of course, Augie could be transferred quite easily. She typed:

DISPLAY WORDS WILL STILL BE FINE. I'M GLAD YOU'RE HERE, AUGIE.

THANKS.

On the second day after their arrival, Dr. Shastri took Lissa and Susan on a tour of the engineering and research level. This was a maze of tunnels, low ceilinged rooms, meeting rooms, and control areas below the green land. Here the main work of the scientific community was conducted. The open space of the hollow, with its sky and greenery, was the living area and the place to get away from the high-pressure environment of work. The green hollow made it psychologically possible for the asteroid's community to exist so far away from the homes of its members. Whenever the controlled work environments grew tiresome and constricting, one could travel inward to daylight and grass.

Lissa saw the preparations going on for the asteroid's departure, and she was impressed by the seriousness of the scientific and technical workers. This was no longer merely a listening project for the

study of a curious alien communication. The fate of all Sunspace might one day depend on decisions that were now being made. As Dr. Shastri showed them around, Lissa became increasingly committed to being there.

"This is the control room for the tachyon detector," Dr. Shastri said as they came into a large theater filled with screens, measuring equipment, and seats for observers. A thrill passed through Lissa as she imagined what would one day happen here. "You saw the core container on the outside when we docked," Dr. Shastri continued. "That container holds a small black hole in a powerful magnetic field. If a tachyon particle enters and is captured by the black hole, the entire field will jiggle, and the event will register on various detectors. We also throw some waste material into the hole, and that generates some usable electricity. Not much yet, but it works in principle. We still depend on our matter-antimatter reactor, the backup inertial fusion container, and solar collectors for most of what we need."

"When will the detector be ready?" Lissa asked.

"Long after we're on our way, I'm afraid. We're having problems with spurious signals. Mike says it's a matter of setting our instruments to register only tachyon reception. That's easier said than done, because we must be able to predict the kind of ripple we can expect when a tachyon collides with our mini-black hole."

Later, Dr. Shastri showed them the control area for the negative-gravity generator. "We've been using negative-g catapults to launch ships from planetary surfaces for some two decades now, but this will be the first time a continuous negative-g force will be used to push an object of this size. It works in smaller prototype vehicles, but the power requirement is still massive. Of course, we'll still have our torch engines as a backup, in case something goes wrong. We can't take any chance of getting stranded out there."

"But an asteroid this size can carry enough simple fusion-power generating capacity to feed the negative-g pusher," Lissa said.

"True. And torchships are as good as we need to get around the solar system at this point in history. But the negative-g pusher is so elegant. It creates no problem for centrifugal spin, so we'll have unperturbed g spin to walk around in and forward motion without the g-force limitations that a human body places on a torchship." Dr. Shastri's eyes sparkled. "Mike says a hundred-g equivalent will be possible, and we won't feel it—assuming, of course, that we can generate the power needed to run the pusher."

"We'll get where we want to go fast," Lissa said. "And we'll need it."

Dr. Shastri looked at her appreciatively. "It's taken decades to build up this facility, and it will have many uses. We may have to go out as far as a hundred astronomical units beyond the orbit of Pluto to find the source of the signal. But we'll be very comfortable, and safe."

"It occurs to me," Susan said as Mike came into the control area, "that this asteroid could take us out to the nearer stars in reasonable relativistic time—"

"Dr. Shastri," Mike interrupted, "the last cargo ship is on its way from Mars. All the final personnel are aboard. I thought you'd like to know. They'll be here tomorrow."

"Good, good," Dr. Shastri replied. "It's all coming together at last." Lissa watched as he turned back to Susan. "The nearer stars, you were saying. Of course, of course, why not? That day will come."

That evening, a few minutes after she had fallen asleep, Lissa awoke suddenly, realizing that when the asteroid left its Sun orbit she would be moving even farther away from Alek than she had expected. It might be years before she saw him again, if ever. He would meet someone else, or she would; the older

feelings would fade, and she would wonder what she had ever seen in him. She knew that could happen by how easily she had put him out of her mind during the journey out here; and she had forgotten him completely during Dr. Shastri's guided tour.

No, she thought as she got up to write Alek a letter. It might have to be read by others and would take some time to reach him, but it would confirm how she felt one more time.

[\[Go to Table of Contents\]](#) |

14

A siren wailed in the hollow.

Lissa got up from her studies and went outside. Susan was sitting on the barracks stairs. Windows opened throughout the complex of twelve buildings, and faces peered out. Many of the off-duty maintenance workers and engineers were out in the fields, standing and sitting down as they waited.

"This is it, I think," Susan said.

An amplified male voice spoke:

"WE ARE ABOUT TO PUT INTO DRIVE. PLEASE FIND A SECURE PLACE IN CASE SOMETHING GOES WRONG

"Nothing will go wrong," Susan said. "The physics is perfect."

Lissa sat down and closed her hand around the edge of the ceramic stair. The sun at the far end of the worldlet flickered slightly, but there was no other sign of anything happening. If the drive worked perfectly, there would be nothing to feel.

"WE ARE MOVING!" the voice boomed. Lissa tensed. There was no going back now. There were a few cheers from the windows. Lissa looked at Susan and smiled.

"Well," her friend said, "we have a lot of studying to do before we get where we're going, and the whole idea is to have fresh, trained minds to interpret whatever we find." She got up and went inside, Windows closed, and the groups of people out in the tall grass began to break up. Everyone had pretty much expected the drive to work.

Lissa sat and looked at the landscape. The lack of any trees in the tall grass made it seem as if someone had peeled off some prairie and pasted it around the inside of the hollow like a rug. There was no wildlife, except for some earthworms. More would be done with the hollow's ecology someday, but for now it was only a camping place for people who worked under the land. Suddenly, the barracks and dirt roads looked shabby to her. It was all comfortable enough, but it was not Bernal One, with its sophisticated urban elegance, or Earth, with its awesome beauty and haunting sense of history.

Her father's last screen letter had told her that the experience of this journey would teach her a lot; but he didn't know what was really going on, or that all humanity might be in danger. *I'm just slightly homesick*, she told herself.

"It is a dangerous journey," Dr. Shastri had said when she had asked him about possible dangers to the asteroid. "But our advantage is that we're housed in a large structure, and that with its new drive we can make the trip quickly."

"What if the drive fails?"

"We have the torch cluster as backup, and we could even build a mass driver track if we had to. Those two methods would get us back to inner Sunspace very slowly, but we would get back. We've taken a lot of trouble to be able to carry so many trained people such a distance and back in such comfort. We want them to have no worries except their work. I don't think we'll have much to worry about with our equipment. It's the unknown, the things no one can foresee, that may pose dangers."

She had known everything Dr. Shastri would say. For much of the journey she would have nothing to do but continue with her studies and familiarize herself with theories about the structure of the outer solar system. The asteroid could stay out there indefinitely, she told herself, for years if it had to. There wasn't much to worry about. Dr. Shastri had stressed the importance of the students to the expedition. Their minds would provide the least-conditioned reactions to the alien artifacts that might be found, and their fresh approaches might make all the difference. Their entire scientific careers would be shaped by what they did on this expedition.

Lissa and Susan had attended various meetings and listened to older teams discussing the problems that might be encountered. There were only four other students on the asteroid, two boys and two girls, but Lissa and Susan rarely saw them, since they lived in one of the overhead barracks complexes. Their own building housed a dozen physicists, men and women who got up early and came back very late. Occasionally one of the women would say hello, but most of the time Lissa and Susan were left alone.

Lissa took a deep breath and looked around at her new, still unformed world, feeling sympathy for its in-between condition. But there had been a time, she reminded herself, when Bernal One had been a complete blank on its inner surface, long before she had been born, before her father had arrived there. Everything begins shapeless and unaware, but already there was a sun here, greenery, and fresh air; and it was the same with her—she was already something, trembling on the edges of becoming more, despite her unhappy restlessness.

Maybe a walk would help. She could circle the inner world in less than two hours. She got up and went down the dirt road toward the watercolor sun. But after a few minutes she began to think again about why Dr. Shastri had chosen her for the expedition. All her ideas to date had been put forward by other people. What did it matter that she had been thinking along similar lines? What did Dr. Shastri expect her to accomplish? She told herself again that he was thinking of the future, that older researchers had once been young, but she still felt unconvinced. Dr. Shastri didn't know for sure what she might be able to do, and she didn't know either. Maybe it would be nothing at all, and she would disappoint everyone as well as herself.

The dusty road in front of her seemed to run straight into the sun. The light was warm on her face, but unlike that of the real Sun, it would not burn her skin or eyes; it was a tamed sun, a light plate, for human use only. She quickened her pace, feeling the gritty dirt crunch under her boots. She looked around, telling herself that she was lucky to be here, that there was no reason at all to feel lost and alone, not even Alek's absence. Everything mattered and nothing mattered. He had put a spell on her, made her sick inside, and it was getting worse after she had thought it had gone away. Alek's parting words had helped for a while only, and now she hovered on the edge of dismay. He should have been here, walking beside her, smiling and being himself, squeezing her shoulders, joking and brushing her cheeks with his lips... he should have been here!

She felt ashamed. There was something terribly wrong with the whole idea of love. It got in its own way, bringing pain and even greater obstacles. Human beings got together to be happy, to bring in the next generation and guide it to maturity because they themselves couldn't live forever; but it seemed too complicated, too roundabout, to feel love and pleasure, to be rewarded and denied, to dream of other

things and then be stricken with needs that were just waiting to spoil everything...

She looked at the timer on her wrist and saw that she had been walking for nearly an hour. She kept on and came to a high metal fence, where she stopped and looked out over the canyon at this end of the world. The sun plate stood on the other side, doing its job without a thought of pain or doubt.

She turned right and walked along the fence, running her palm across the metal weave. Listening to her own thoughts had made her jumpy, and the walk had not calmed her down.

The road veered away from the fence and headed back across the length of the asteroid toward another block of barracks. She realized that she was walking toward a complex that would be at a right angle to her own barracks; but as long as her feet stayed on the ground and her head pointed toward the empty space, the land directly ahead would seem level, curving away left and right, and closing above her head. And this worldlet, she reminded herself, was moving toward the outer solar system, slowly building up an awesome velocity. The asteroid's path would resemble a very flat parabola, tending toward a straight line; and somewhere beyond the Orbit of Pluto, the worldlet might slip into a wide orbit around a dark body, a dead world of planetary size, and the search for the source of the alien signal would reach its final moments...

Ahead, among the buildings she was approaching, people were still doing some construction, molding ceramic materials into building components and fitting them together. She stopped and looked around the hollow. Barracks clusters now stood in every quadrant. The group she was approaching was the last to be completed; it would house the most recent arrivals, They had come in the last hours before the drive had been switched on, and had gone immediately to prepare their quarters.

She drew closer, wondering if Alek thought about her as often as she did about him. Maybe he had already forgotten her. *I'm so green*, she thought suddenly. It didn't seem right when viewed from the outside, but it felt right from the inside no matter what she told herself; deep down, her feelings for Alek seemed strong and immovable. He was alive inside her. Images of him changed and spoke to her. She listened and watched within herself, tingling at times, yearning, reaching out toward him. It seemed that she might be able to steal into his mind and surprise him; but she always fell back into herself, dismayed by the distance between them.

Power tools hummed as she came along the road. Buildings in various stages of completion stood at her left and right. Men and women in helmets and goggles were heating sections together with white-hot probes.

Did growing up mean becoming emotionally dependent on a person who had once been a stranger? She had needed her parents, but they had chosen to have her; parents had to raise their kids, make them strong enough to go on their own. But Alek was someone she had found, a stranger who now held her feelings by long strings, pulling her toward him all the time despite what he had said; and part of her was glad the strings were there, attached to the mushy, weak parts of her that she didn't understand...

She stopped and watched the construction. There was a worker kneeling on the roof of one barrack. He wore no shirt. She took a few steps closer. He stood up. The sweat glistened on him as he turned around, and she saw that it was Alek.

[|Go to Table of Contents |](#)

He hadn't noticed her yet. She probably looked very different in her blue coveralls and boots. She wanted to shout to him, but held back. What was he doing here? If he had taken the work to be with her, then why hadn't he come to see her upon arrival? He might have called or sent a message easily. Suddenly she had the feeling that he might be embarrassed by her seeing him like this.

Slowly, she turned away, hoping that he wouldn't see her.

"Lissa!" he shouted before she had gone ten paces.

She stopped, confused by her own feelings and the tone of his voice. He sounded harsh, and suddenly she didn't want to see him, but she turned around in time to watch him leap down from the roof of the single story structure. He landed unsteadily on his feet, then fell on his hands in front of her.

"Are you hurt?" she asked as he looked up at her with a dirty face.

"No," he said. "I should have realized that a small place like this would have a noticeable coriolis effect."

"Didn't they warn you that if you jump you might not come down where you planned?" she asked sternly.

"Yeah, they did," he said, getting up and brushing dirt from his jeans.

She was looking at his face, but he avoided her eyes.

"Hello," she said awkwardly.

He looked at her finally. "Hello. I guess you distracted me. I've made that jump before with perfect counterbalance." He smelled sweaty and his hands were dirty. "Dr. Shastri got me this job," he went on. "It's not anything like yours, but I like it well enough, and there may be other opportunities."

"I'm not doing much," she said softly, feeling a bit guilty.

"But you will."

She smiled. He smiled back.

"Come see me later?" she asked, feeling strange.

He nodded. "Sure, soon as they let me free for the day. I'd better get back, or I won't have a place to live." He turned away and climbed the ladder carefully.

Lissa started back toward her quarters, cutting across the tall grass instead of following the road. Once she looked back and saw Alek watching her from the roof. She waved, and he waved back. His barracks complex seemed to be at the top of a rise now, due to the inward curve of the asteroid.

Suddenly she had the feeling that she was being managed by Dr. Shastri. Alek was here to keep her happy, so that she would study and work. She wondered if that meant that Dr. Shastri thought little of Alek, and anyone else might have done just as well, as long as she was interested in him.

Alek was still looking at her. Neither of them had moved. He held up his hands in a questioning gesture. She waved again and turned away.

That evening, as she waited for Alek to come by, she sat at her desk worrying again about what Dr. Shastri expected of her. Because if he had gone to so much trouble to keep her happy, then he must be expecting something special, she told herself. The possibility of accomplishment excited and depressed her at the same time.

There was a knock on her door.

"Come in," she said as faint laughter exploded from one of the nearby rooms, reminding her again that the sound insulation was not perfect in these barracks. It sounded like Susan again.

The panel slid aside after a moment. Alek came in, closing the door behind him. As he turned to face her, she noticed he had washed and put on fresh coveralls.

He smiled. "Hello, Lissa," he said shyly, almost as if he were afraid of her.

She turned her chair and sat back as he went over and sat down on the corner of her bunk.

"So how have you been?" he asked.

"Okay, I guess. You sent no messages."

"I know." He looked at her. "Lissa, what is it? Aren't you glad to see me?"

"You signed up for this only because of me, didn't you?" She suddenly wanted him to say yes, and another part of her wanted him to say no.

"Well, not entirely. They needed craftsman trainees, and if I was willing, Dr. Shastri said, then I would be preferable to candidates from outside the Institute."

Lissa's pulse quickened in disbelief. "Don't you see?" she demanded. "He let you come because of me!"

"I thought of that, but who cares? *I can* do the work, Lissa. Don't you want me here?"

She shook her head. "It's not that ... It's, well, I think it lowers you. You should be doing something else."

He took a deep breath and stared at the floor. "Like what? Working for my father's firm? I don't know why this is a problem for you. I accepted Dr. Shastri's offer, not you. I like what I'm doing. Besides, there's a chance—"

"Do you, really?" She looked at him with surprise.

He stood up suddenly. "You know, I may have misjudged you. You're just a snob, that's all." There was a bitter, sarcastic tone in his voice that made her afraid of him. She looked up at him and shook her head in denial, opening her mouth to say no and that she loved him, but her throat tightened and she couldn't. "I guess we just didn't know each other very well," he said sadly.

"No," she managed to say as she stood up.

"Oh, yes," he replied firmly. "I'm here for myself. The pay is very good, the experience is interesting, and I'm looking forward to what I can learn, no matter how small my contribution. So you go about your business and I'll go about mine."

"Alek," she started to say as he went to the door, opened it, and was gone. She stood there, unable to go after him, unable to feel what she thought she should feel. Maybe it was better to be free of him, she thought coldly as the faint sound of laughter crept again through the walls.

It seemed strange to her, in the following weeks, that she was able to continue with her studies so easily and with so much interest. The fact that Alek was nearby, and probably doing what he wanted, quieted her doubts and enabled her to work. She continued her routine degree work and tried to keep up with

the progress of the tachyon engineers and the signal deciphers. Much of what was going on was still beyond her technical skills, but Augie broke it down into simple English: The transmitter was far from being ready, and the decipherers were now putting major effort into extracting pictures from the alien signal. Pictures were probably the sign language of interstellar communication, and might one day make it possible to build up a common language with the alien senders. But the number of pictures that were being fished out of the signal were few and far between. The one clear series, suggesting danger from the Oort Cloud, seemed to be the only real information that the senders cared to have understood.

As she followed the work of the advanced teams that were working on the signal and the transmitter, Lissa began to understand how minor a part of the expedition were the students. She could witness what was going on, learning what she could as a supplement to her basic studies, but her own work lay in the future. Charles Darwin had voyaged on the *Beagle*, studying the life of Earth; but his real work had come much later. No great honor would have been attached to his presence on the ship if he had not organized his experience after his return to England. By giving them this experience, Dr. Shastri was betting on the future work of his students. But breaking through to a vision of her own individual work seemed as elusive as deciphering the full meaning of the dancing signal.

Occasionally, she saw Alek from a distance, walking with a crew on its way to a job somewhere on the inner surface. Once she saw him in the hallway of her barracks, checking an electrical line, but he didn't see her as she ducked into Susan's room. She woke up one night saying his name aloud, thinking that he was beside her.

The spinning asteroid moved outward, ever outward, a rock hurled away from the Sun. The matter-antimatter reactor worked efficiently, providing the immense flow of power needed for the negative-g pusher. Lissa found herself looking outward mentally, to the darkness of outer Sunspace.

"You don't ever mention him," Susan said to her one day as they ate lunch in the cafeteria on the engineering level.

"There's nothing to say," Lissa answered, sipping a glass of milk.

Susan smiled. "Well, you may not know it, but you're making up your mind about him all over again, way down deep, where you can't just decide anything you want."

"Is that what I'm doing?" Lissa said vaguely. "I don't think I care anymore. I fell hard on Earth, but I've recovered. I see things clearly now."

"Don't take too long," Susan said, looking more serious. "I liked him a lot myself."

"Thanks, but it won't work," Lissa replied. "I know you're too busy right now."

"Don't be so sure."

They were silent for a moment.

"What's your problem?" Susan asked finally. "You seem to object to Alek's being here."

"It's not that," Lissa replied. "It's just that it all seemed settled in my mind. Alek would be on Earth, and I might or might not ever see him again. But now I have to come to terms with my feelings about him all over again."

"And you don't want to decide?"

"Not now."

"Don't you think you're being self-centered about it? People aren't toys that will wait for you on a shelf. And you can't always have ideal conditions in which to make important decisions."

Susan was right, Lissa realized. "Then what should I do?"

Susan smiled. "Nothing. Let it happen as it will. Alek is here because he wants to do the work, and so are you. Don't feel you have to decide anything."

"You don't think that would be cowardly?" Lissa asked.

"No. You'll both have time to really think about your feelings. It might be a very good thing."

"Thanks, Susan. You're a good friend."

Lissa woke up. The night glow of the sun plate was faint in her window. For a moment she imagined that she could feel the asteroid's ever-increasing velocity. Something was waiting in the outer solar system ...

She got out of bed, opened her window, and looked out into the stillness of the hollow. A faint breeze stirred the grassy interior. She sat down in the window and gazed toward the moon plate, wondering about herself.

Dr. Shastri wanted something from her, and so did Alek. What did she want from herself? A moment of uncaring passed through her, and she realized with a chill that others might do whatever work could be her own. Alek probably wasn't interested in her anymore. She hadn't seen him in weeks.

She should never have let him invade her mind. How had it happened? He had simply become part of her before she knew it. How could she have known? Being a human being meant not being able to know everything about one's inner self or that of another. It was hard to accept that her mind was not all-powerful over her feelings and desires.

She closed her eyes. The breeze made her shiver, and she knew that she would have to face what lay within her, as well as what waited for humankind in the dark beyond Pluto.

But not right now, a part of her whispered, *not right now, later ...*

From where she sat in the window, the small world was motionless in a night of its own making; but viewed from outside, she was pressed to the inner surface of a spinning world, which turned on an axis of light. Nothing ever seemed to be what it was. *I'm changing into someone else*, she thought, *losing what I was, and no one can give me back myself ...*

She opened her eyes and saw that the light plate was beginning to brighten toward dawn.

[|Go to Table of Contents |](#)

16

Dr. Shastri walked into the small auditorium and looked around at the assembly of students and observers. The now-familiar alien signal continued its strange dance on the screen.

"How does he stay so calm-looking?" Susan whispered to Lissa.

Dr. Shastri glanced up at the signal. "We've learned so little from it." He sighed and stuck his hands in his jacket pockets, managing to look boyish despite his age. "However, we've now located the exact source of the signal." He smiled. "We're crossing the orbit of Pluto right now, and our acceleration is up to ten

g's." He smiled again. "I still find that remarkable. A conventional acceleration that high could crush us, but with our negative-g drive it's identical to free-fall, while spin gives us the illusion of slightly less than one g." He shook his head. "I only wish that our four shuttles were large enough to carry negative-g generators. It will be more cumbersome exploring in them, but we can't have everything."

The screen flickered behind him. Starfields appeared, overlaid by a coordinate grid. One small square began to flash red.

"That's where it is," Dr. Shastri said, "over seven times the distance of Pluto from the Sun. We can't see it because it's a dark body, but we'll be there in less than a month."

The starfields drew Lissa, lifting her out of herself, away from the problems caused by people. The fact was brought home to her again that something was speaking to humanity from the darkness, that a small part of humanity was speeding outward to the source at millions of kilometers per hour, and that she was part of the adventure of reaching out . . .

"I'm still sorry to report," Dr. Shastri continued, "that the tachyon receiver-transmitter is not yet working, and we can't say when we'll have the bugs out of it." He looked around at the people in the chamber. "I'm hoping that a few more of you will visit our various projects as a supplement to your studies. We could use some extra help, and I think it would be good to poke your noses into the work of our older researchers. You might see something they don't." He smiled again. "That is my hope, at least. Too many of you have kept to your routine studies and minor duties. Break free a bit—don't be afraid."

Lissa kept very busy during the next month. When she wasn't alone, she was visiting the tachyon installation, or the negative-g drive control area, or just watching the alien signal doing its endless cosmic dance. She learned a lot of advanced mathematics. It took her into another kind of universe, and into another part of her mind. Math quantified the universe into a system of fine limits, in which the unknown was encircled by known quantities, thus forcing the unknown to reveal itself. There was no unknown that did not leave a trail, somewhere, and could not in principle be unmasked by experiment and reasoning.

She surveyed what was known about the outer solar system, the region beginning at 40 times the distance of Earth from the Sun and ending at some 10,000 times that distance. This volume of space was filled with millions of asteroids and bodies as large as Earth—all moving with great slowness around the Sun. Beyond this region, 30,000 to 50,000 astronomical units from the Sun, lay the cometary halo, the fabulous Opik-Oort Cloud, made up of ice and frozen gas—a great barrier reef before the ocean of interstellar space. From the inner solar system the Cloud was as invisible as a swarm of bees a million kilometers away, but the Centauri starship had confirmed the halo's existence on its way out of the solar system.

The asteroid wasn't going out quite that far, but it could, and much more. This run was as much a test for the negative-g drive as it was an investigation of the source of the alien signal.

Lissa also read many of the great works in the humanities from the nineteenth and twentieth centuries—the novels in which the human heart struggled with itself, with restrictive social systems, and with other hearts. These works tuned her feelings and made her see clearly where thought alone could not. Her two favorites were Rudyard Kipling's *Kim* and Elizabeth Bowen's *The Death of the Heart*.

There were evenings of music. Many of the scientists and researchers were musicians, and they got together regularly to give concerts and recitals of chamber music. Lissa would sit in her window, listening to great chords sounding through the green hollow. The grand symphonic sound structures of Gustav Mahler and Ralph Vaughan Williams were great favorites, but Dr. Shastri complained that more modern works were being ignored.

Sometimes Lissa went to the concerts and sat on the grass with Susan, noticing the couples and hoping vaguely to see Alek. But he was never there, and the moment when she would have been glad to see him always passed. She wondered if she liked him better as someone she had left behind on Earth, a person to dream about but not have to deal with. I must be a very selfish person, she told herself in critical moments.

One day she saw Dr. Shastri outside the tachyon receiver control room, and decided to ask him a question.

"Doctor, I haven't seen Alek Calder anywhere for some time. Do you know where he's working now?" She took a deep breath as she waited for his reply.

Dr. Shastri smiled. "Of course. He's moved to the engineering level. He's training with the shuttle pilots. I'm told he's quite good at it."

"What?" Lissa asked, surprised by the information and by her sudden twinge of jealousy.

"Yes, it's what he wanted from the start. He'll probably be going out to chart the source of the alien signal if he checks out in time. I'm told he's one of the best. He flew airplanes back home. We're lucky to have him."

"Thank you," she said turning away, feeling confused as she headed toward the elevator that would take her up into the hollow.

Alek would get to go outside. He would explore, with only a suit and shuttle between him and the unknown. So this was what he had been planning all along!

She turned suddenly and ran back down the hall after Dr. Shastri.

"Oh, Doctor," she said breathlessly as she caught up with him.

"Yes?" he asked as he turned to face her again.

"Will any of the rest of us get to go out and examine the source of the alien signal?"

"You wish to go?" he said impatiently, cocking one eyebrow.

She nodded. "Very much. Do you think it will be possible?"

He smiled. "I don't see why not, assuming we don't find it inaccessible or dangerous." He was looking at her intently, as if he'd lived her life and countless others, and knew the motives behind all requests.

"Thank you, Doctor," Lissa said, feeling much better.

"You will excuse me," he said abruptly, "but I have an appointment."

She nodded and turned away. As she walked down the long passageway, it seemed to her that she had become another person. *What are you worried about, she asked her stranger self, that Alek Calder will beat you out of something? You're only a minor member of this expedition, a student, she told herself, and you're not likely to awe anyone with a major breakthrough. So what are you afraid of?*

The stranger within did not reply. Lissa stopped, knowing that her feelings were irrational. None of this was real. Alek couldn't be a threat; he was only doing what interested him. She should be proud of him. He might even be the pilot who would take her to the site of the alien transmitter.

Endless possibilities still waited for her. Nothing was decided.

[|Go to Table of Contents |](#)

17

Beyond Pluto, nearly 300 astronomical units from Earth, the Sun was only a bright star. Here bodies moved in stately orbits, strolling members of a whirlpool trillions of kilometers wide; dark, airless worlds by the thousands, asteroids, clumps of ice and frozen gas. The combined mass was probably greater than a dozen Jupiters.

Lissa watched as the asteroid slipped into a wide orbit around a black shape twice the size of Earth. Data runs at the bottom of the screen reported that the dark world had a large moon and a ring of debris. The alien signal was coming from somewhere on the moon's equator.

An inset of the signal appeared in the lower left hand corner of the screen. The dancing line seemed unchanged. Lissa had discussed with Dr. Shastri the possibility that the signal was emanating from an alien probe that had landed on the moon of the dark planet. She was hoping that the device possessed a level of cybernetic intelligence that would enable it to communicate when approached.

She watched nervously now, hoping that the source would respond to their presence and reveal itself to be something more than an automatic program. She wanted very badly to be right in her prediction, even though she knew it was a long shot.

But as the asteroid swung around the black world, the signal remained unchanged, despite the greetings that were being beamed at it.

Dr. Shastri smiled at her and shrugged gently. The room quieted as he got up and turned to address the gathering. "There may be a lot to learn when we examine the design of whatever is down there, but there doesn't seem to be an alien delegation waiting to meet us here."

"When will some of us get to go?" Lissa asked.

"The landing coordinates are being established right now by a reconnaissance shuttle. As soon as the area is checked out, we'll put in a team of initial observers. Some of you may go with them, or with later groups."

"We're coming in over a flat area now," Alek's voice said from the screen. The picture suddenly showed a rocky landscape under bright stars as the shuttle drifted in for a landing.

Lissa tensed in her chair. The crowd in the room became silent.

"It'll be a routine landing," Alek's voice said finally, and she realized that she was probably the only one in the room who was worrying.

She knew that Alek wasn't really in any danger. He was lucky to be making the landing. She wished for a moment that she were with him.

The picture jiggled for a moment as the shuttle fired its jets and set down on the surface. Bright search beams swept the rocky surface and fixed on a strange sluglike object.

"It's a vehicle of some kind," Alek said as the camera pulled in for a close view. The skin seemed pitted, scarred, and stained.

"It looks very old," Dr. Shastri said.

Throughout the engineering level, Lissa knew, people were watching this picture. Here, finally, was the source of the alien signal. She felt a bit disappointed; the signal was still the same, and the problem of understanding more than a small portion of it had not changed.

"It doesn't seem very large," Alek said. "I bet we could pick it up and take it home. Maybe taking it apart will give us a clue about what kinds of minds built it."

"Perhaps," Dr. Shastri said.

"We'll go out and take a look around," Alek said; "then you can send in the next shuttle. I don't think there's any danger here."

Lissa's turn came to go down to the black moon. The first two teams had checked the surface around the alien object and had found no obvious dangers. Dr. Shastri was going, and Susan Falleta, and four specialists in metallurgy and electronics. It was the third day after the asteroid's arrival.

Lissa finished putting on her space suit and followed her companions into the shuttle's passenger cabin.

"All aboard?" the pilot's voice asked over the intercom. She tensed, thinking that it might be Alek, but it wasn't his voice at all.

She floated over to the empty couch next to Susan, pulled herself in, and strapped down. Susan reached over with a gloved hand and closed her faceplate for her.

"I was going to do it," Lissa muttered over the suit com.

"Sure you were. What's wrong? You're too nervous. Still worrying about him?"

"I guess. For a moment I thought he was the pilot."

"And you're glad he's not?" Susan chuckled.

"Why should it make any difference? Maybe he's the copilot this trip."

"Come on, don't tease me. I guess I'm afraid that if I see him, I'll start to feel different."

"You mean you'll like him again? Just like that!"

"I guess. Let's not discuss it."

"Here we go," the pilot announced at last.

Lissa felt a gentle tug as the shuttle slipped out of the dock. A small screen lit up in front of them as the black planet came into view.

"There's a lot of debris in this space," the pilot said. "You may hear some micro-junk hitting our fenders."

The shuttle accelerated gently to one half g. Lissa looked over at Dr. Shastri. His faceplate seemed to be a great eye looking at her.

"There it is," the pilot said.

The small moon was on the screen, growing larger as the shuttle rushed toward it. Lissa saw the lights of the expedition base camp on the black surface.

"Coming in," the pilot said.

The shuttle's acceleration died suddenly, and Lissa felt as if her stomach had just fallen out. Slowly the craft turned around on its gyros, facing the engines toward the moon. After a moment the engines fired again, slowing the ship's forward motion.

It was all automatic. The computer sent out radar tongues, constantly measuring angles and distances. The pilots were important only if something went wrong. They set course programs, made repairs, and waited to take over if a landing wasn't going right.

The engines fired. Deceleration pressed her into the couch. She felt a jolt, and the engines shut down.

"We're here," the pilot's voice said in her ear. "Next tour begins in five minutes," he added jokingly.

The distant Sun was an ordinary star, and all the noise of human history was silenced by distance. Lissa looked up at the stars of the Milky Way and saw where the moon's dark parent blotted out the stars. The planet was a half million kilometers above her, yet it seemed close, even threatening.

Dr. Shastri and the others were a dozen meters ahead of her, moving slowly in their suits. She caught up easily in the light gravity, and together they approached the alien object.

It was a large drum lying on its side. She guessed that it was ten meters tall, perhaps twenty long. She came up to it and touched it as if it were a living thing. No one had found a way inside yet, and no one would really try until it was decided what to do with the artifact—whether to bring it aboard the asteroid or study it right there.

Behind them stood the three domes of the base camp, looking every bit as strange as the alien drum. Powerful lights were fixed on the artifact, but the dull surface was not very reflective. The flat surface of the moon around the object was cracked and cratered.

Lissa heard a laugh in her ear. It was Harry Gillies, one of the metallurgists. "Looks like a parade went by and left an instrument." He laughed again. Lissa remembered that his hobby was the history of magic and alchemy, and she wondered if the alien metal's structure would seem magical to him.

"It might not be safe here," Lissa said, looking around at the small impact craters.

"That's true," Dr. Shastri agreed. "It may very well be prudent to take the artifact aboard the asteroid, where we won't risk the chance of damage while we study it."

Lissa made a fist with her gloved hand and struck the side of the drum. It was hard. She put her helmet against it and struck again. There was no resonance inside her helmet.

"It's as if the whole thing is solid throughout, she said.

"It may in fact be," Dr. Shastri replied.

A sudden thought came to her. "They made it in one continuous process, completely solid, with patterns of function built in. We would only destroy it if we took it apart."

"At least we'll have it safe," Susan said, "even if for some time all we'll be able to do is listen to its signal."

"It's that or going to the expense of keeping a permanent base here," Dr. Shastri added.

Lissa felt disappointed. But then what had she expected—that the alien device would suddenly give up all its secrets when she confronted it? Dr. Shastri had brought his students face to face with the alien as an

ultimate exercise in the nature of difficulty. He wanted to confront young minds with the awesome fact of the alien device's existence. Again, Lissa made a fist and struck the drum, realizing that here was a challenge of understanding that humankind might not be able to meet.

"Maybe it's a toy," Susan said, "sent to develop the minds of a youthful civilization."

"Why do you think that?" Dr. Shastri asked.

"Because that's what it's doing," Lissa answered, impressed by Susan's insightful speculation. "It sits here, singing, driving us crazy with curiosity. Look what we've done to get out here!"

"Interesting," Dr. Shastri replied.

Lissa got up one morning, a week after her visit to the black moon, and saw workers bringing the alien drum up into the hollow. A massive elevator platform rose from the engineering level, and the alien artifact was wheeled off on a giant carriage. Lissa sat in her window and watched as the carriage traveled a distance into a green field and stopped.

A hundred meters away, a radio dish was pointed toward the artifact, so that its signal would continue to be received as clearly as possible.

Lissa felt a thrill at the strangeness of the scene: a large bowl confronting a gray-black drum in a green field, inside a spinning hollow rock where the sun was a flat disk ...

After a while she went back to her desk and punched up the signal on her screen. It was the same dancing line that she had first seen inside the mountain on Earth. She watched for a while, then got up and went back to sit in the window. It was all so difficult and disappointing, she thought. Part of the signal seemed to warn of a possible danger to Earth in the future, but there was certainly much more in the signal than frustrating pictures. She felt impatient and confused. It would take her forever to learn enough to contribute to the project, and others might do all the most important work before she could even complete her education. She felt that she was losing herself again, and that nothing would ever turn out according to her dreams.

She sat in the window for a long time, watching the silent confrontation between Earth's ear and the alien drum. Time slowed as her feelings played within her. Memories combined with strange shapes. Alek smiled at her. Her mother looked worried. Her father looked thoughtful. Bernal One's inner world was a garden turning slowly among the stars...

After a long while she saw a glint of light flash from one of the elevator kiosks at the end of the road that led up to the barracks complex. She watched as Susan stepped out and started up the road very quickly.

As she watched her friend approach, Lissa realized that she had never seen her walk so quickly, or gaze so fixedly ahead. Halfway up the road, Susan kicked a stone angrily.

Lissa sat perfectly still until Susan came up to the stairs and noticed her in the window.

"Hi," Lissa said.

Susan tensed, as if caught in an unkind thought.

"What's the matter?" Lissa asked, feeling strange and shadowy.

Susan stuck her hands into her coverall pockets and stared up at Lissa with tear-filled eyes.

"Alek's shuttle doesn't answer," Susan said with a stutter.

"What?" Lissa sat up and put her feet down over the window sill.

"They can't get an answer! He went to pick up the last group from the base camp, but he never got there. They think the shuttle might have been hit by orbital debris from the ring, stuff too small to guard against on scanners, and gone down on the black moon. It doesn't seem to be anywhere in nearby space. His radio is out."

Lissa grasped the window frame with both hands as Susan recited the facts. It just couldn't be, she thought, suddenly seeing Alek's body in the shuttle's wreckage. "What are they doing about it?" she demanded coldly.

Susan threw up her hands. "They've sent out automatic search drones, hoping to pick up a signal, but it's been hours already. There's a team in the search-and-rescue operations room, but they're only waiting."

As the other girl went up the stairs, blood rushed into Lissa's face. Tears pushed out of her eyes, and she realized suddenly that she had never known anyone who had died. She had imagined, vaguely, that Alek would be there always, waiting for her, no matter what she did. She had put him away for later, selfishly, with almost no regard for his feelings. Now he was gone and would never return. He had lost himself coming after her. He would not grow to become his full self, he would not be there for her, or for anyone else.

Susan entered the room and came up to the window. "Don't blame yourself," she said softly. "He knew what he was doing. It might have been any of the other shuttles."

Lissa turned suddenly and faced her. "Then why wasn't it! Now I'll never be able to make it right."

Susan put her arms around her.

"I'm sorry," Lissa said, crying, "I'm so sorry...."

"So am I, kid."

"I ignored him," Lissa whispered.

They were silent for a few moments. Lissa stopped crying and just held on to her friend.

"Maybe they'll find him," Susan said finally, but there was no belief in her voice.

[Go to Table of Contents](#) |

18

Lissa went with Susan to the elevator kiosk. The door slid open, and they stepped inside. The lift dropped down gently to the engineering level. Lissa sniffled as the door opened. They stepped out into the passageway and turned left toward the rescue operations room.

"Are you sure you're up to this?" Susan asked. "They'll let us know if they find him."

Lissa shook her head in denial.

"I could stay for you," Susan added.

"No," Lissa replied, quickening her pace.

The doors slid open for them as they approached. Inside, they went up to the railing that ran around the work pit. Below, the large screen displayed the view from the searching drones' eyes. Insets revealed infrared patterns on the surface of the black moon, but these were very weak readings. There were only three people at the consoles, a man and two women.

Lissa grasped the rail with both hands and closed her eyes, remembering her first meeting with Alek. He had seemed so rude, so smiling, yet something in her had responded. She recalled his touch, his kiss, his laugh.

It was a moment before she noticed that Dr. Shastri had arrived and was staring intently at the screen. Suddenly she wanted to shout at him, to reproach him for interfering with her life. Why couldn't he have left Alek on Earth, where he would have been safe and waiting for her? Why did he have to meddle?

Dr. Shastri looked at her calmly, then embraced her. I'm hopeless, she thought, selfish and unfair. He patted her on the back and stepped away.

"It may be only their communications equipment, my dear. They might have set down somewhere quite safely, or be adrift."

He didn't sound as if he believed it.

"These shuttles have plenty of supplies," he continued, "and their air-water recyclers can work indefinitely."

"If they haven't been damaged," Lissa muttered.

"The craft has many fine backup systems."

Lissa nodded and tried to hope.

"I'm very sorry," he said, "truly I am. I suspect I know what you must be thinking, but please believe me when I say that Alek wanted very much to come with us, and he wanted so much to pilot spacecraft."

Lissa nodded again. She clenched her teeth and held back tears. "He's a good pilot," Dr. Shastri said, "and so is his partner. They'll come out of this, if anyone can."

But the search dragged on. Lissa sat cross-legged by the rail, watching the mindless screen displays of the black moon, preparing herself for the worst. Susan brought hot drinks regularly and kept her company.

"You've been here six hours," she said finally. "You should go home and lie down for a while. They'll call us if anything happens."

"No, I'll be here until it's over, one way or the other."

Susan touched her hand. "Come on, you'll collapse."

"So I'll collapse."

"Lissa, start making sense."

Lissa glared at her.

"I'm sorry, but I'm trying to be your friend, so I have to think of you, even if you won't. You know I cared about him, too."

"I know," Lissa admitted. *Maybe he should have chosen you,* she thought.

"I know what you're thinking," Susan said. "Stop blaming yourself. He probably would have come even if he'd never met us. You didn't think of that, did you?"

"You're right. But I wish there were something more we could do," Lissa said.

"We can't outdo the drones, and we're not trained to pilot, even if they were sending out shuttles."

Susan went and brought back two sleeping bags. Lissa crawled inside hers and tried to rest, but she woke up once every hour to stare at the screen.

The shift changed in the pit, but still the drones found no trace of the lost shuttle. Lissa began to think that the craft might have crashed on the big planet, rather than on its moon. Toward morning, when she at last began to doze for longer periods, she dreamed of the shuttle going down, unable to fire its braking engines. Without retros, that type of craft had no chance of surviving a hard landing on an airless world. The drones had found nothing because there was nothing left for them to find.

Half awake, Lissa sat by the rail, her sleeping bag around her shoulders. Shot after shot of rocky surface came up on the big screen and passed away, revealing nothing. The drones made their endless patterns, casting bright beams of light across the black, pitted surface.

"Drink," Susan said, handing her a cup of coffee as she sat down next to her.

"Thanks," Lissa replied, taking the cup even though she never drank coffee. She sipped, glancing at Susan. Her friend looked tired and exasperated. "Just leave me here," Lissa said. "I can manage."

"You shouldn't punish yourself like this," Susan said sternly. "If Alek is gone, you'll have to face it sooner or later."

Lissa dropped her cup. The hot liquid burned in her lap, but she ignored it.

"I'm sorry," Susan whispered.

Dr. Shastri came in from the hall. Lissa looked up at him. He was looking at her in a kindly way, not quite smiling, not quite serious. He thinks I'm going crazy, Lissa thought.

"May I suggest that the two of you go up to the tachyon project for a while. It's coming along splendidly, and I know that you'd like to be there when scanning starts. Someone will inform you as soon as the shuttle is found."

Lissa tensed with hope. He sounded so sure that it would be found. Maybe he already knew something. She searched his face for a clue. He smiled.

"That's a good idea," Susan said, standing up.

Lissa got up slowly, noticing the coffee stain on her coveralls. She felt light on her feet, as if she were dreaming.

"I'll be there later," Dr. Shastri said. He turned and went back out into the hall.

"Come on," Susan said.

Lissa glanced down into the pit. Nothing had changed on the big screen. She turned and followed Susan out into the passageway.

They got into the first available cab. Susan punched in their destination, and the small, open vehicle whirred away, taking them down the length of the asteroid. Lissa stared at the overhead lights in the distance. They appeared from above the inward curve of the passageway in a constant stream of bright circles. The land of the hollow was above them, she thought; the stars lay below her feet, beyond the asteroid's outer crust. Up and down would be defined in this way, she thought compulsively, as long as the asteroid continued to spin and the centrifugal effect mimicked gravity.

The passage turned gently to the right. A cab passed them in the other direction. Lissa looked over at Susan and smiled. Susan smiled back uncertainly as the cab slowed gracefully and stopped.

They got out and went through the automatic doors into a crowded gallery. Some thirty people sat at work stations in the control pit below, facing a giant screen. The gallery itself was filled to capacity with observers, and suddenly Lissa knew that the search for Alek's shuttle was not very important to the project. Whatever happened, the life and purpose of the asteroid community would go on.

Susan found two seats in the back row.

"We're going to turn on the receiver!" a woman's voice boomed over the speakers, breaking the tension that had been building.

"About time!" someone shouted back.

"They've had a bad time of it here," Susan whispered. "One bug after another in the equipment. All kinds of false signals and annoying noise."

"I know," Lissa said. Against all her feelings, she found herself waiting with the crowd and caring about what would happen next. If there were tachyon communications going on in the galaxy, or even beyond, they might be picked up instantly. Thousands or even millions of light-years might mean nothing to these superfast particles, assuming the detector was good enough to snag them.

She took a deep breath, knowing suddenly that this was a special moment—the first chance to learn if radio was in fact only a primitive means of communication. It still seemed right to her, it had always seemed right to her, that radio was too slow, and that only a faster-than-light means of communication made any sense for a star-traveling civilization. Tachyons could not travel slower than the speed of light. Three hundred thousand kilometers per second was their slowest possible speed, and no one knew what their maximum might be.

She thought again of the containment sphere at the forward end of the asteroid, where the small black hole was imprisoned within a powerful magnetic field; and she imagined a pond waiting for a pebble to drop in and send out waves in all directions. The magnetic field would jiggle when the tiny black hole swallowed a tachyon, because it would be impossible for the black hole to stand still as it gobbled the particle, and that would shake the very sensitive magnetic field. The shaking would show up as colored lines on the blue screen in this control pit. The problem had been to prevent anything else but a tachyon from disturbing the field, or at least to know what those inputs were and allow for them. One thing was sure: No random disturbance would look like an intelligent signal for long. Enough work had been done to predict what a tachyon's ripple would do to the containment-wall coils as the field jiggled. The colored line would dance as a visual analog of the jiggling field. A sound analog would be created by a synthesizer.

"Here we go," the woman's voice announced. "The sphere is rotating."

The sphere, Lissa remembered, was set up so that particles might be captured across a meridian running from the sphere's north to south poles. One rotation would cover the whole sky, except where the asteroid itself might block reception.

The crowd in the gallery held its breath.

"Nothing," the woman's voice announced finally. "I'm afraid we're not getting any kind of feed into our instruments. We'll check our equipment and try again. It shouldn't take more than a half hour."

Lissa let out a nervous sigh and sat back. It might take longer than that, she suspected, and it was still possible that no one out there was using tachyons as a means of communication. Suddenly, Dr. Shastri sat down next to her.

"Anything, any news?" she asked as her throat tightened.

He shook his head. "No, nothing yet." He patted her hand. "How about here?"

"Equipment foul-up of some kind," she managed to say. "They're fixing it now." Dr. Shastri sat back and waited.

"I have the impression," he said after a few moments, and without looking at her, "that a circumstance was created long ago for our civilization, or for the possibility of its emergence, a circumstance that may be a judgment about us. It's a judgment that is renewed against us every X number of years, and can be proven wrong only if we survive long enough to learn its nature. Do you have any ideas about what I'm describing, Lissa?"

She knew at once that he was trying to distract her from worrying about Alek, but at the same time she knew how she would answer his question.

"Yes, I think so," she began. "You suspect that someone doesn't want too many civilizations spreading through the galaxy. It would be a simple matter for an advanced technical culture to affect a solar system's cometary halo in a regular way, thus aborting the possible rise of intelligence. But we've found a radio source, which, among other things, may be warning us of the danger from our own halo. This suggests that someone is trying to help us, while others are trying to keep us from developing. And the use of radio suggests that they wanted to warn us quietly, not too directly, with the aim of making us work for what we find out. It may be that the same intelligences that are trying to stop us are also helping us. Maybe they think we have some promise and deserve a sporting chance."

Dr. Shastri glanced at her and smiled. "So you surmise that there may be galactic weeders and nurturers. Why?"

Susan was looking at her with concern, Lissa noticed. A few people in the surrounding seats were turning to follow the discussion.

"There may be a number of reasons," Lissa said.

"What's the best one, in your view?" Dr. Shastri demanded.

"Well, it's easy to see," Lissa continued, "that if many civilizations are coming up from, say, the background of G-type stars, then the first such civilization to achieve interstellar travel could sweep the galaxy in less than thirty million years, perhaps even faster if we make other assumptions. If that can happen, then contact between the mobile and the sun-bound cultures brings the less-developed culture's growth to a halt. The more-developed culture's ideas are adopted, and the only thing that would make the lesser culture interesting, namely its further individual development, is destroyed. Now it's possible

that the first culture to sweep the galaxy learned this when it found itself surrounded, in time, by images of itself, in the form of cultures it had influenced a billion years earlier. So it began to nurture individual cultures, or worlds where life might develop, by keeping them from bursting the bounds of their solar systems, by letting them be destroyed by periodic catastrophes. This kind of thinning of cultures prevents the galaxy from being choked with intelligent life. However, the ice ages caused by cometary collisions would slow life's development without completely stopping it. A time would come when a variety of cultures would have a chance to shine. Emergence onto the galactic stage might be a slow process, based on the careful exchange of technical and ecological information—information that would help the culture control its darker side, so that other intelligences might benefit from its unique outlooks."

"But that means that some cultures would die and never rise," Dr. Shastri said.

Lissa nodded. "Of course. But consider that the weeders might have seen great tragedies in other galaxies. Imagine whole galaxies used up for resources and only one culture to show for it."

Dr. Shastri nodded.

"It sounds very hard, very mean," Susan said.

"But they wouldn't see it that way at all," Lissa insisted, knowing exactly what she would say next. "They would witness life coming up, growing into self-awareness and tragedy at the same time, and they would look for a way to help civilizations grow up less mean, more individual and ethical—and contacting such civilizations directly would not be the way to do it, since that would destroy the individuality that we might develop if left alone, which is all that they would find interesting in us. So, by slowing us down, they preserve the galaxy's resources, and by isolating us they preserve our individuality. Maybe they've also seen countless cultures perish in nuclear wars and from technological catastrophes, and there may be more that die in these ways than from intervention."

"And where are we?" Susan asked.

"Somewhere in between, I hope," Lissa replied.

"Maybe we'll make it and maybe we won't."

"Go on," Dr. Shastri said.

"Okay—the fact that we've received what appears to be a warning, via a radio transmitter placed so close to our Sun, suggests that opinion may be divided about us. Among the weeders there may be secret nurturers. Or maybe a nearby civilization sent the probe to prod us. Don't you see? Any kind of interstellar message, however puzzling, will have a shaping effect on a culture." Lissa looked at the faces around her. "Well," she said finally, "this is all conjecture." And she remembered that Alek was still lost, probably dead, and she had launched into all this talk to make herself forget, if only for a few minutes.

"Yes, it is speculation," Dr. Shastri said. "But we do have the radio source, and we think we've understood one picture from it. And if we discover tachyon communications going back and forth across the galaxy, that will strengthen the possibility that Lissa is describing an actual state of affairs. Perhaps not exactly, but something like it. A number of us have speculated about these things, but this young woman seems to be able to do it on her own, with only the smallest hints, as naturally as breathing. The fact that we've been contacted by radio while a more advanced form of communication may exist suggests that someone wanted to make sure we got the message, and couldn't count on our being able to receive or send tachyons."

"That means that they must not be watching us all that closely," Lissa said, feeling a bit embarrassed by

Dr. Shastri's comments about her. He was not only suggesting that her original work was years away, but that she had a great gift for chasing ideas up *other* people's paths. It seemed to her that there had been a hint of critical doubt in his voice. Maybe this was all she would ever be able to do. Everything was so much harder than she had imagined.

Suddenly she felt drained. Dr. Shastri had succeeded, engaging one part of her mind while another was screaming with outrage over the loss of Alek. Her intelligence had been teased, even delighted, while her emotions were crushing her, preparing her for the loss of someone she loved.

She touched her forehead and felt sweat. Her throat was dry. "I can't stay anymore," she whispered to Susan. "I'm going back to see." Dr. Shastri was looking at her with concern as she struggled to her feet.

"I'll help you," Susan said, taking her arm.

"We're ready to try again!" a man's voice announced over the speakers.

The screen in the pit lit up into a bright blue and began to flicker. Lissa saw the look of interest return to Susan's face. "You stay," Lissa said. "I'll go myself."

But then the room fell quiet as the screen showed a dozen multicolored lines, all dancing like strange snakes seeking to wrap themselves around each other.

Lissa almost turned away, but the sudden understanding of what she was seeing stopped her. She watched with wonder and curiosity as the lines danced; more lines appeared, superimposing themselves on the previous ones as if struggling to weave a fabric of some kind. These, she realized, were tachyon signals hurrying between galactic civilizations, exchanging the only thing in the universe worth trading—information, knowledge, unique viewpoints about the nature of life and the universe.

"Our Sun seems to be a tachyon crossroads," the man's voice announced, "a focus of some kind."

"That's very curious," Lissa heard Dr. Shastri say.

The galaxy was alive with the gossip of civilizations, she realized. Conversations were going on at immense speed between vast centers of power and culture. And yet someone had bothered to send Earth a smoke signal!

How the radio buoy had arrived on the outskirts of the solar system, no one would probably ever know. Lissa felt a moment of awe and pity. Alek was not as important as this new development; it would change all human history forever.

But suddenly she knew that she would trade it all for a message telling her that he was safe. If he were found, she would never let him leave her again. She stumbled past Dr. Shastri and rushed out into the passageway.

[|Go to Table of Contents |](#)

19

Lissa felt torn as the cab whisked her back toward the search-and-rescue center. It would have been wonderful to have seen the great success of the tachyon receiver with Alek by her side. But somewhere he was fighting for his life, dying under a cold, starry sky; he might already be dead, his body rigid and unfeeling.

It can't be, she shouted within herself as the cab pulled over. She got out and rushed into the screen room. Only one person was on duty as she approached the rail and gazed again at the black moon. The technician below was watching a small screen, on which the drama of the tachyon reception was still unfolding.

Lissa sat down again by the railing and stared at the black moon. Alek had to be down there somewhere.

The drones had simply missed him. It was as simple as that.

She closed her eyes and felt the pressure of tears welling up inside her.

No, she told herself again, *he's not dead. I won't cry yet*. She adjusted her legs into a cross-legged position and settled down to wait, thinking that there was something cold-hearted about the way Dr. Shastri had tried to distract her. He was only thinking of the future, of course, of what would endure, balancing personal concerns against a greater good, and there would always be conflict and cruelty in that. Was it possible to love without worry and complications, to see other people without barriers, to feel their thoughts as clearly as one's own, and not be hurt?

Her mind wandered back to the story of the weeders and nurturers that had emerged in her discussion with Dr. Shastri. Maybe other things were true, and fit the scanty facts just as well. Perhaps across billions of years, natural catastrophes destroyed intelligent life constantly. High civilizations might have lived and died on the same worlds several times. Add to this the possibility of self-destruction through nuclear war or ecological disaster, and it became clear that living technical civilizations might be very scarce. Maybe species with interstellar capability routinely searched out intelligent life and tried to prevent its destruction through subtle forms of contact—ways of shaping a culture without endangering its individual development, by getting it accustomed to the idea of cultures beyond its sunspace without direct confrontation, by giving warning but no advanced knowledge, by stimulating thought ...

She worried again about the danger from the cometary halo. Even Earth's Sunspace culture would not be able to deal with the rain of thousands of comets into the inner solar system. Many would miss the planets, but those that hit Earth, Mars, and Venus would inflict irreparable damage to the ecologies of those worlds, not to mention loss of life. Would the industrial capacity of Sunspace ever be equal to such a bombardment, even if warned a century in advance? The Sunspace habitats, being potentially mobile, would probably survive, but it would be a vastly diminished humanity that would gaze upon the ruins of the natural planets.

Lissa stared at the big screen as she thought. The black moon's northern hemisphere filled the whole frame. A light flickered in the northeast quadrant. She blinked and saw it wink on and off.

"Did you see that?" she shouted to the technician below.

He didn't answer. She saw that he was hunched over his panel, listening intently.

"Did you see!" Lissa repeated.

He raised his hand for her to be quiet. "I'm picking up old-style code! Deciphering now!"

Lissa waited. The message appeared on the screen, superimposed across the black moon:

TAKING OFF NOW. SHIP BADLY DAMAGED. IF YOU SEE TAKEOFF, PICK ME UP IN HIGH ORBIT. CAN'T BE SURE THIS MESSAGE WILL GET THROUGH.

A lonely flash appeared on the black hemisphere, and stayed lit. The shuttle was rising on its nuclear engines, burning bright in the screen's infrared sensors. Drones fed in views from different angles.

Lissa tensed, watching the screen, unable to believe what she was seeing. Alek was alive and on his way back.

After a few minutes, the brightness blossomed and disappeared.

"The shuttle's exploded!" the technician shouted as the drones converged on the craft's last position. Telescopic scanners pulled in toward the point high over the black moon where the explosion had registered, but there was nothing to be seen.

Lissa grasped the rail supports with both hands and pulled herself to her feet. *No, no, no*, she repeated, realizing that Alek had worked all this time to repair the downed shuttle, and had used his takeoff burn to signal his position, hoping to be picked up before the shuttle failed. His radio had been damaged, so he had rigged an old-style radio transmitter, good enough to send dots and dashes.

Now he was gone for sure, blown to pieces when the shuttle's damaged engine had overheated.

Drone eyes searched the volume of space, pulling in closer and closer. Suddenly she saw a space-suited figure tumbling against the stars.

"Alek," she whispered in shock, realizing that he was probably dead. It might not even be Alek, but his copilot. She waited, hoping to glimpse another figure in the void, but there was no one else.

"Shuttle launched," she heard the technician say in the pit. "Pickup in less than an hour at charted position. Recalling all drones."

The waiting was endless. One by one the large screen lost its inputs from the drones, until finally only the picture of the space-suited figure remained, tumbling high above the black moon.

"Have you tried getting the pilot on the suit's radio?" Lissa called down to the technician.

"Of course. No answer."

She looked around the gallery. The empty chairs seemed to be waiting with her. She felt lonely and cold. The man below seemed to be doing a routine job. More important things were happening in the tachyon project control room. The expedition to the borderlands of Sunspace would be a success, leading to consequences vastly more significant than the lives of two shuttle pilots. It wasn't fair; it was only the way things had happened. If it had been another shuttle, another pilot, then she would have been in the other gallery, listening to the stars speak. There was no way, she realized, that the excitement around her would drive out her feelings for Alek. She would have to accept that fact and cope as best she could.

The tumbling figure disappeared for a moment, then reappeared.

"They're very close now," the technician said. "The rescue craft has the pilot on its scope."

Lissa watched the turning figure, trying to catch some sign of life in the bulky limbs, but there was nothing except the slow turning of head over heels.

"Be alive!" she whispered through clenched teeth, surprised by her own vehemence. She felt her face relax, certain that the suited figure, whoever it was, could not be alive.

"They're coming close now," the technician said excitedly, surprising her with the concern in his voice.

Suited figures appeared at the edge of the screen, maneuvered toward the tumbling figure, and stopped it by grabbing its shoulders. Then they fired their jet packs and drifted off the screen, on their way back to

the ship with the rescued pilot.

"Who is it?" Lissa demanded, her voice echoing in the large chamber.

The technician raised his hand impatiently. "They'll know in a few minutes."

Time slowed. Her stomach collapsed into a rock. Soon her heart would stop.

"They're in the airlock. It's cycling."

Lissa gulped air.

"They're inside."

Her pulse raced as time stopped.

"They've got the helmet off."

Sweat ran into her eyes.

"He's alive," the technician said softly.

"Who?" Lissa screamed from the gallery. "For God's sake, tell me!"

"Just a moment," the technician replied, holding up his hand again.

"Well?" she demanded after a moment, waiting.

"He's not hurt at all," the technician said, his voice breaking.

"Who is he!"

The man turned his chair around and looked up at her. She saw a middle-aged face with sunken eyes and a day's growth of beard. She had never seen him before.

"It's Calder," he said grimly, brushing back his disheveled black hair with his hand.

Lissa let out a deep breath.

"I'm sorry," the technician said. "I thought you knew Pandasala Gbeho. She was one of our best pilots." His tone was sad, and Lissa realized that he had expected her to know that it was Alek as soon as the rescued pilot had been identified as a male. "Pan was my best friend," he added softly, then turned away and began to shut down the center. Lissa stared at his back for a moment, not knowing what she could say to him to express her sympathy for his loss. Finally, she retreated and went out into the passageway.

She caught a glimpse of Alek as they brought him off the rescue shuttle. He was on a stretcher and she almost cried out at his paleness. But the medics weren't taking any chances. They put him in the hospital and ran all kinds of tests. He was allowed visitors two days later.

Lissa showed up early. Dr. Shastri was just coming out. He smiled as Lissa went in.

She tried to look cheerful. Alek looked a bit surprised as she came up to the bed and caressed his face with her open hand.

"Missed me a little?" he said, smiling.

She swallowed hard and nodded. He pulled her to him and kissed her for a long time. "Never thought I'd get to do that again," he whispered, holding her tenderly.

She stood up after a moment and sat down in the chair by the bed. "Alek, what happened?"

He shrugged. "Big piece of something went right through the ship. Pan was killed right away. It just took her head right off."

Lissa's stomach lurched.

"Do you want to hear this?"

She nodded. "Yes, I want to know how it was for you."

"Well, after screaming a lot I managed to land. The debris strike happened during our landing approach to the base, but we drifted quite a ways off. Radio was out and every system was failing as I came down. The ship hit roughly. Pressure was down in the cabin and I had only my suit to rely on, but I set about trying to fix what I could. Mostly, it was the controls that were gone, so I knew if I could rig them back I might be able to take off again." He smiled. "That took longer and was much harder than I thought. It took a lot of crawling around in the ship's innards to find the connections. Those crawl spaces were not made for space suits."

"Were you afraid?"

"Of course I was." He closed his eyes, and Lissa saw sweat on his forehead. "I'll be fine in a moment. Anyway, I got the crude version of the radio working, but I couldn't be sure anyone would receive what I sent, since I couldn't receive. I sent messages a few times, then took off, but the controls were completely unreliable. All the safeties were gone. I couldn't be sure if the ship's engines would hold up, since I had no way to know where the safety was on the throttle. The automatic programs had safeties, but they weren't there to tell me if the engines were overheating. I got up into orbit, hoping they'd picked up my ascent burn on the infrared scanners, and went out the airlock about three minutes before she blew."

Lissa caught her breath repeatedly as she listened to Alek's story, realizing just how close it had been, and how resourcefully he had performed in a harrowing situation.

"I've told this a few times already," he said, "once for a recording. It was strange, drifting out there with the black moon nearby, and its big planet beyond, and the stars in all directions. I was all the humanity there was, all that was left, it seemed. The Sun was a far star, not very special at all." He touched her hand. "I thought of you before I blacked out."

"I'm sorry, Alek," she said. "I'm sorry I snubbed you when you joined the project. I'd like us to start again, if you want to. Maybe we can do better this time."

He smiled. "I knew that if only I could get back you'd know how you felt about me. So maybe it was worth it."

He was silent for a moment, and she knew that he was thinking of Pandasala.

"So," he said finally, "I hear you've had a bit of excitement here also. Dr. Shastri told me about it."

Lissa nodded. "It's awesome. A whole section of the galaxy has lit up. We don't know what they're saying, but just to know there's so much life out there, and that what are certainly very different civilizations are talking to each other, is a sign that one day we'll also understand."

He was looking at her admiringly. "You'll have a lot of work ahead of you."

She smiled and took his hand. "When will they let you out?" she asked eagerly.

"Tomorrow," he said, looking into her eyes. "I'll come see you."

[Go to Table of Contents](#) |

20

The next day was a Friday. Alek came up the road to Lissa's barracks. She watched him from the window, admiring his stride, glad that he was alive and that they would be together. *I'm getting brainless about him again*, she thought distantly, but accepted her feelings. They were just as real as anything else important. There would never be another Alek. Together, they would just have to see how it would all work out, even if it didn't.

She turned from the window and hurried from the room. He was halfway to the barracks when she reached him.

"Let's go for a walk," she said.

He smiled and took her hand, and they walked back the way he had come. They passed the kiosk and she led him across the grassy field to the alien drum. They sat down outside the fenced area.

"Dr. Shastri thinks it's a warning," she said.

"I know, he told me. What do you think?"

"I think it is."

Alek gave her shoulders a squeeze. "Shastri says you've come up with a lot of ideas on your own."

"Sure, but other people also had them."

"But that's just as good," he insisted, "as long as you didn't know what the others thought. Keep doing that and one day you'll come up with stuff no one ever imagined."

She looked at him and saw suddenly how much faith he placed in her abilities. "Thanks," she said.

"What do you really think is going on?" he asked as she rested her head on his shoulder. "We know we're not alone, but we can't be sure of anything about the cultures out there."

"Well, I've been thinking that it's possible that the weeders and nurturers came to a compromise of some kind about up-and-coming civilizations. Advanced cultures may value the fresh viewpoints of new intelligences, but they don't want the galaxies overcrowded and stripped of resources by a biological explosion, since that would destroy the very values of uniqueness and diversity that they prize. One species could colonize a whole galaxy and use its resources long before other new intelligences could evolve on those worlds where life is possible. That's why the weeders decided to work on the prehistory of worlds where intelligence might develop, slowing development long before the actual appearance of mind and consciousness."

"Like family planning and birth control."

"Maybe even cosmic abortion at times," she said, "if a species turns out to be psychotic. But I think that

after intelligence establishes itself in a sunspace, it has a chance of outwitting the weeders. I think this was allowed for also. If a culture can rise to a certain point of sanity and knowledge, and doesn't weed itself out, then it can overcome the outside weeding process."

Alek shook his head impatiently. "I don't like something about all this. What right have they to judge anyone?"

"Because they have to, Lissa replied. "Life is common, and the galaxy would fill up, denying others a chance. But civilizations get through the weeding sometimes."

"We don't know that."

"True. But I can't help feeling that we were drawn out to the edges of our Sunspace so that we could think of all these things for ourselves, gently, without major cultural dislocations. We've learned nothing except what we have to know to go on to the next step. It'll be a long, reasonable time before we learn what the tachyons are saying to each other, but all the while we'll know that advanced cultures are out there, very different from each other, waiting for us to earn the maturity to be able to talk to them."

Alek sighed. "It's serious business, and it may be very dangerous. Ours is not exactly a sane history."

"We haven't had a major war in nearly a century," she said, "but the real danger may come from the comets. We don't know how long we might have, or how we'll divert so many when they come Sunward. It may take all the resources, planning, and cooperation we have."

"Maybe it'll never happen," Alek said.

"That's possible. Maybe how we react to the comets will be our final test."

Alek was silent, holding her as they gazed at the alien object inside the fenced area. The ear from Earth was still pointed at the big drum, listening.

"Funny," Alek said suddenly. "You came out here to find aliens and you found me."

Lissa laughed. "At least I could understand what you were saying."

He looked at her critically. "Not completely, not right away."

She put her head back on his shoulder. "I wasn't listening very carefully, I guess."

He leaned over and kissed her gently. She heard his heart beating as she embraced him. She listened, feeling herself begin to sing inside.

"There's Dr. Shastri," Alek said.

She looked up and saw the scientist following the fence around the alien artifact.

"He doesn't see us," she said.

"Of course he does," Alek replied. "He's just too polite to show it." Alek lifted his arm and waved. Dr. Shastri started toward them. "See, I told you."

They started to get up as he drew near. "No, don't get up," he called. He came up to them and sat down next to Alek.

"Is there some kind of news?" Lissa asked.

"No, nothing. I needed a walk, so I came to contemplate our signal drum." He chuckled. "It is in fact as sophisticated as a jungle drum sounding through the forest." He became more thoughtful in his expression. "There will be a small service for Pandasala Gbeho tomorrow."

"We'll be there," Lissa said.

"Did you know her well, Alek?" Shastri asked.

"Not very. She was the backup pilot."

"She was from Kenya. A large family will miss her."

"So what happens now?" Alek asked after a silence.

Dr. Shastri locked his arms around his knees and stared at the alien drum. "Well, some of us think we should go out into the cometary halo and see if we can locate the disturbance that would be likely to send objects toward the Sun. We think that the radio message also carries a suggestion of where such a disturbing influence might be. Do you think that's a good idea?" Alek answered. "Yes, but only if you could be sure of the coordinates. What would we do if we saw the danger?"

"That depends on what kind of object it turned out to be. It could be something we might be able to divert or destroy. Better to prevent the cometary rain now than try to stop comets one at a time later. It would be a great service to the future of humanity if we could at least determine what we are dealing with."

"We should go," Lissa said determinedly.

"Of course, if the danger comes from our solar system's passage through galactic dust clouds, then there won't be much we could ever do to prevent disturbances of the Oort Cloud."

"But we would know that it's not being done on purpose, if we find nothing else," Alek said.

"We would be gone for at least two more years," Dr. Shastri added.

"Has the decision been made?" Lissa asked.

"I think it will be decided that we should go. Almost everyone I've spoken to seems to agree."

"Anything new with the tachyons?" Lissa asked.

"No, and we won't learn anything from them for a long time, I'm afraid."

Alek shook his head in wonder. "It's surprising how much we seem to have learned without deciphering all that much. Earth may be in danger, great civilizations exist out there that think enough of us to contact us gently, and perhaps they also disagree about our worth."

"Some say that all our conjectures are made of scanty facts and coincidences," Dr. Shastri said.

"I don't think so," Lissa said. "The Others *are* out there. We were *led* by circumstances to think all these things."

Dr. Shastri sighed. They looked at the alien drum. It sat quietly on the grass. The ear from Earth seemed just as composed, listening, determined to understand across what seemed to be a bridge of silence.

"Perhaps civilizations also fall in love with each other," Dr. Shastri said, "and the tachyons are singing love

songs composed of knowledge and history. A music of information is passing between vast individuals, much in the same way that the genetic code passes between lovers and mingles to produce children."

When we grow up as a species, Lissa thought, the Others will sing to us, and we'll understand their songs.

"I'd better get back," Dr. Shastri said as he stood up. "No, no, you two stay. You deserve some time together." He turned and started across the field to ward the road.

Lissa felt a great affection for him as he marched away. *He was a great nurturer, she thought, despite a weeding streak.*

"He looked out for us," she said as Alek put his arm around her.

"I know," he replied, holding her close, "I know."

[Go to Table of Contents](#) |

Book 3

Behind the Stars

1

What calm composure will defend

Your rock; when tides you've never seen

Assault the sands of what-has-been

And from your island's tallest tree

You watch advance What-is-to-be?

The tidal wave devours the shore;

There are no islands anymore.

—Edna St. Vincent Millay

Max treasured the afternoons that he had always had to himself until dinner time; but the extra hour of school set aside for discussing his habitat's arrival in Earth's Sunspace had cut short the best part of his days, making him more resentful of going back, even though he had known all his life that the return was inevitable.

In less than three months, the once distant future would become a new present that would change his life forever, probably for the worse. Maybe something was really wrong with him, since all his classmates seemed to be looking forward to the great event, apparently unaware that anything was going to be taken from them. Was it his problem, or everyone else's? It was bad either way.

Elaine Jonney came into the room. Max blacked his holoscreen and looked up as the display frame retracted into his desk. A middle-aged woman with short black hair, Tutor Jonney had soft brown eyes that gave her a friendly look, but she was a demanding teacher.

"With arrival now only three months away," she began, "all of us in the teaching unit are confident that we've been able to prepare you adequately for the return. We hope that our preparations of the last year will help make the return a rewarding experience for all of you."

Max couldn't imagine Elaine Jonney ever being anything but confident, but he did not dislike her. Most of the time he could forget about her and listen to what she was teaching.

"I want to emphasize again," she continued, "that the tapes, films, and holos of Earth that you all grew up with cannot completely prepare you for the openness of a planet. The sky, oceans, deserts, rivers, mountains, canyons, and weather will be strange and wonderful, maybe even a bit distressing. Some of you might remember what the surface of a planet is like from our years of exploration in the Centauri system, but Earth is an inhabited world of cities and towns, with billions of people."

Max found that part of it hard to take—that there were so many people. He glanced around at his classmates. Lucinda ten Eyck always looked attentive when the return was being discussed, even when she was playing with her long red hair. Emil LeStrange, her chubby younger brother, nodded to himself from time to time. The Sanger twins, Jane and Alice, just smiled. Muhammad Bekhter seemed to have a questioning look on his light brown face. Max was determined not to reveal his own feelings until he understood them better, and maybe not even then.

He raised his hand as the tutor finished speaking.

"Yes, Max?"

"Will it really be that distressing?"

"The surface of a planet is very open. Having grown up inside the hollow of this habitat, you'll be getting used to living on the outside of a world, with only atmosphere above you."

"Is that all you meant?" Max asked.

"Even though the surface of a planet curves the other way," she continued, "it will seem flat and endless, and that might be disturbing."

Max had stepped into enough virtual holos to know that the land on Earth would not rise up and around, and that there would be a distant horizon, and experiencing these sensations had not bothered him then.

"Max?"

He nodded. "I guess that was it."

"Maybe Max has agoraphobia," Lucinda murmured. Max tensed. Emil shook back his long, sandy hair and chuckled, obviously enjoying his sister's comment.

"I'm sure he has nothing of the kind," Elaine Jonney said. "He's just naturally apprehensive and is willing to admit it. Fear of open places is very rare, but any kind of change can be disorienting at first."

Maybe that was all it was, Max thought, trying to stay calm.

Muhammad grinned at him. The twins stared at him as if he had suddenly become someone else. Lucinda crossed her long, bare legs. Her green eyes mocked him.

He looked back at the tutor. She seemed to be expecting him to respond.

"What is it, Max?" she asked finally.

"Nothing—I was just curious," he said uncomfortably, avoiding her eyes. Everyone was probably convinced that he had *something*. "Earth will be great," he said suddenly. "I can't wait to get there."

There was a long silence.

"Max, see me after school," Elaine Jonney said with a look of concern.

"Now, Max," Elaine Jonney said when the classroom was empty, "tell me what this is all about."

He looked into her eyes and wondered if he should say anything.

"I know it's not agoraphobia," she said.

"It's nothing."

"I know you better than that."

"Look, all I did was ask a question," Max said, "and Lucinda didn't miss her chance to get in a dig. It isn't as if it hasn't happened before."

"That's true, but you seemed more disturbed by it this time. Are you sure that—"

"Those two think they're better than everyone." That much was partly true. Emil and Lucinda were conceited, and he had never known them to be friendly to anyone. Sarcasm seemed to be their primary means of communication, from what he could tell. "Maybe," he continued, "it's just finally getting to me. I'm glad I won't have to put up with it much longer."

"Why do you think they act that way, Max?"

Max shrugged and sat back in his chair. "Maybe because their mother is Navigator."

Elaine Jonney sighed. "And that's all there is to this?"

Max hesitated, then said, "And you keep using words like distressing and disturbing at least twice a week."

"And that bothers you?"

Max nodded. "It's as if you expect us all to be bothered, no matter what you say."

"You're deliberately misunderstanding," she said with a look of exasperation. "Okay, Max, you can go."

Outside, in the great hollow of the habitat, Max ran along the path through the trees and came to the waterfall on the asteroid core's inner equator. He lay down on the soft grass by the stream and felt the warmth of the distant sunplate on his face. The time until dinner had always been his to do with as he pleased, and he still had most of it, but he no longer felt the pleasure of escape.

He closed his eyes and put his hand into the cool water. After what seemed only a few minutes, his wrist ID timer beeped five o'clock. He opened his eyes, leaned over and sipped some water, then lay back and gazed at the countryside overhead. The inner carpet of the asteroid hollow swirled down into the bright sunplate two kilometers away at his left, and into the rocky area the same distance to his right. He imagined that he felt his world turning, pressing him down into the grass, even though he knew that the only major sign of the voyaging habitat's spin was his feeling of weight.

"Hey, Max."

He looked up, annoyed at having his solitude disturbed. Muhammad walked toward him and squatted by the stream. "You really can't wait to get there, can you?" the dark-haired boy asked.

Max was puzzled at first, then remembered what he had said in class about how Earth would be great. "Sure," he replied. "Everybody is excited. Aren't you?"

"Well, yeah." Muhammad grinned. "My father's got a whole itinerary worked out—first Paris, then Damascus, and he wants to visit all the relatives in Tashkent. It'll be great—all those cities and people. It has to be more interesting than here, right?"

"Sure—it'll be terrific."

"I guess I'll miss this place, but it's time to see something different." Muhammad sounded a little tense, as if he were trying to convince himself about Earth's wonders, but maybe Max was only imagining that.

"Look, I still have some studying to catch up on." Max got up, his time alone by the stream lost; he felt angry at Muhammad for taking it from him. "Have to go." He hurried away, heading down to the library in the circle of trees below the falls.

He liked the saucer-shaped building that housed the library. There were no doors, only open entrances and exits. He went inside, found an empty terminal and sat down. The library's memory fascinated him because he could demand an answer to any question, not just to material from class discussions.

He liked to study alone; class discussions too often seemed faked. It was too easy to ask questions or give answers just to make a show of having something to say. Lucinda often used the discussions to take apart another student's response, even when all she really had to do was answer a question, while Muhammad, who was smart, often held himself back in arguments, as if being everyone's pal was more important than making his point. Max preferred to find things out for himself, by asking real questions in private.

He liked to invent questions that couldn't be answered easily by the library's memory. The Artificial Intelligence would hunt for the answer in its banks, and find that there wasn't enough there to make a reply, which would force it to describe an area of ignorance, or to construct an uninformative, general answer that would be unintentionally funny.

It wasn't the library's fault. Most of its knowledge was over twenty years old, and additions made during the habitat's voyage to Alpha Centauri could not equal the work done in that time by the millions of researchers in the home Sunspace, working in thousands of fields, using even more advanced Artificial Intelligences. "They're way ahead of us," Max's father had told him. "Just think of all the new things we'll learn when we get back!"

Max did not turn on the display, but sat staring into the dark frame, feeling that everything was about to be taken away from him. He got up from the terminal and wandered to the center of the saucer, determined to keep to the routine that he enjoyed. There he sat down in one of the observation chambers and put on a helmet.

Suddenly he was floating among the stars. The ones ahead were shifted into redness as the habitat collided head-on with their light, compressing the waves into the shorter lengths that were red to the human eye. The light catching up with the habitat was stretched into long, ultraviolet frequencies. He watched the hues vary, wondering at the vastness of the universe and the strangeness of being alive, of being himself rather than someone else. He might have been a star or a planet instead of something that wondered about itself.

When Max came out into the golden light of late afternoon, a pedal glider was moving down the long, zero-gravity axis of the hollow, the space around which the habitat turned to give the inner surface and levels below a centrifugal gravity.

This was the only home he had ever known. It was carrying fifteen hundred and seven people back to what the adults called home, to the star called the Sun, to the family of planets and habitats of which Earth was the parent. Arrival time was now only two months away, and there was nothing he could do to change the scheduled return to the civilization that had launched his world across the 4.3 light-years to Alpha Centauri. The return would complete a great adventure, his parents had always told him.

Maybe it was the idea of there being so many billions of people on Earth, the Moon, Mars, and elsewhere in Sunspace that made him unhappy about leaving the habitat. Humankind was much larger than the portion he had grown up with. There were only a hundred and four kids in the returning habitat. On Earth there would be people he had never met, and would never meet. He had seen many people in the library holos, and had listened to their lectures and watched their behavior in old films, but he had never quite believed that so many people could all be different from one another. With thousands of millions, too many would be alike. It seemed strange and unnecessary to have so many, nearly twenty billion throughout Earth's Sunspace.

"Should we have raised children?" he had once overheard his mother say. "I sometimes wonder. You know what some are saying—that we've brought up a bunch of self-centered kids without a lot of social skills who won't ever fit in back home."

"I've heard it, Rosalie," his father had answered. "Those people are the ones who didn't have kids."

"Maybe we were selfish, Joe," she had continued, "telling ourselves that having children would make our journey more normal. We wouldn't feel so alone as a community all these years. I worry that we had these children for ourselves only. What if we've spoiled them for any kind of life back home?"

"Oh, I don't think so," Joe had said.

"Max has never known anything but this protected world," Rosalie had objected.

"He'll learn and adapt, I'm sure."

Max went down the library path and strolled between the tall maple trees until he came out on the road that led up the habitat to his house. The sunplate was warm on his back as he walked toward the rocky forward end of the world. After a few minutes he slowed his pace, still feeling resentful. His parents had always talked of "going home"; but they had lived there, so abandoning the habitat could never mean as much to them. He imagined it in orbit around a crowded Earth, empty and waiting to be torn apart, or used for some other purpose. Everything he had known would be gone, and the Earth would swallow him.

A chill passed through him as he turned around and gazed at the beauty of the sunplate and green hollow, then closed his eyes and felt every part of the habitat within himself. The original asteroid had been five kilometers long. Its open space, four kilometers long and two across, had been cut out of the core. Just outside the hollow there was an engineering level, and beyond that hundreds of meters of rock and nickel-iron protected the inner world from the dangers of space. Rotation gave the inner surfaces nearly one Earth gravity. It wasn't the same as gravity on a planet, where the large mass exerted its own pull; centrifugal gravity was the same action that held water down at the bottom of a bucket spinning at the end of a line. There were dangers in walking around on a surface where your head pointed toward the center of the world and the stars were outside, under your feet, and if you jumped too high you might not come down where you wanted; but he was used to it, and felt pride in understanding his world.

He left the road and climbed the grassy hillside. Halfway up he lay down on his back and gazed up at the land two kilometers overhead. It was always a wonder to him that this peaceful scene of green countryside, roads, paths, and houses was moving through space at a speed that he understood but could not imagine. The vast power output of the matter-antimatter reactors went into the null-gravity field, whose gentle but continuous push made it possible for his habitat to attain the high fraction of light speed needed to reach the nearer stars in a reasonable time, and to do so in relative safety and comfort. Earth was readying other habitats to voyage to still farther stars. Slowly, humankind would spread outward into this spiral arm of the galaxy.

Max did not remember the arrival at Alpha Centauri. He had been born just as exploration of that system was beginning, and his earliest memory was of Centauri A, the yellow sun of the triple star system, and its fourth planet, where for the first time he had seen oceans and green continents, all on the *outside* of a world so much larger than his own. The sight from space had frightened him at first.

His parents had taken him on a field trip with some of the other children, so they would see something of the alien system before departure. "They should have a memory of this place," his mother had said. Max remembered the colors of the three suns. Rocky moons circled the dead worlds of the small red sun. The dim white sun seemed lonely. Centauri A resembled Earth's Sun, his father had told him.

Lucian "Lucky" Russell, a planetary specialist, had piloted the shuttle, and had given a lecture about its systems at the end of the two-week trip. By the time Max was seven years old, a new habitat was being built in high orbit around Centauri A-4. Five hundred people had settled inside the second hollow. It would explore and carry on research in the Centauri system while the first habitat went home.

The trip from Earth had taken nearly ten years. Allowing seven years for exploration at Centauri, time for acceleration, deceleration and maneuvering, and another decade for the return, some twenty-seven years had passed since the habitat left Earth's Sunspace. Joe Sorby and Rosalie Allport, Max's parents, were twenty-seven years older, but their friends back home had aged nearly thirty-six years, because at two-thirds of light speed, time on the habitat passed more slowly than it did for people on Earth.

"We'll try for a higher velocity on the way back," his father had told him. "We'll get back sooner, from our point of view, but even more time will have passed on Earth." Max had not understood all this too well at age seven, but at sixteen Einstein's Time Contraction Theory was no longer a mystery; it seemed only natural that fast-moving clocks ran slower in comparison to clocks left behind. This was true not only of mechanical clocks, but also of biological clocks like his body. The habitat's return would be quicker at eighty percent of light speed, but the price would be arrival farther in Earth's future, so the final decision had been to return at two-thirds of light speed, not only to avoid the psychological problems of a larger dislocation in time, but also to save wear and tear on the habitat from high-speed collisions with interstellar gas and dust. At speeds closer to that of light, even the smallest particle would strike the habitat with enormous force, so even more energy would be needed for the deflection shield.

Max didn't care if he arrived farther in Earth's future; he had nothing to lose, since he had never seen Earth and knew no one there. People who had been the same age as his parents would now be older. That was interesting, but for him the only thing that mattered was that he would lose his home and have to face a strange new world. The people of the habitat would disperse to places on Earth, the Moon and Mars, to other habitats, going wherever their work took them.

He had never quite believed that it would happen. His next-door neighbors, Leni and Arthur Cheney, would move away, and he might never see them again. Max smiled bitterly; he would even prefer to put up with Arthur, who had bullied him when they were younger and now settled for getting off an occasional sarcastic remark when his sister Leni wasn't around to restrain him. Once, he had wished that Arthur would be sucked out of an airlock, never to be seen again; now he was already starting to miss

the creep. It was like thinking about dying, or trying to remember the time when he couldn't read or do math. People lived well past a century, but sooner or later death would come. He could not imagine dying, and he had never worried about the return to Earth until this year, but here it was, coming closer every minute.

He sat up in the grass, feeling a bit warm. The sunplate was dimming now, glowing orange as the afternoon faded. He felt a slight breeze on his face. Filmy clouds appeared in the great open space, drifting across the houses on the other side of the world. Max lay back again and closed his eyes, trying to regain his feelings of happiness and unconcern for the future. He breathed deeply, then opened his eyes to the yellow flowers near him, pushing away the image in his mind of a rocky nickel-iron asteroid decelerating toward a Sunspace that he would never be able to accept as home.

He got up suddenly and hurried down the hillside. He passed the elevator kiosk at the crossroads just as Jane and Alice Sanger emerged from the engineering level below the countryside, where their father worked in climate control. They usually visited him after school.

"Hi, Max!" the twins called out together, and smiled the same broad smile as he went by them. Sometimes one of them would call out "Hi," and the other "Max," and they also liked to finish each other's math problems.

"Hello," he called back nervously, hurrying on; he didn't feel like talking to anyone just now.

He turned up the path to his house and stopped, as if seeing it for the first time. His father had once told him that single-level structures of its kind were common in vacation spots on Earth. They were temporary dwellings, with minimal insulation and security, and were usually made of wood or ceramic materials. The habitat's perfect weather and enclosed, gardenlike conditions were made to order for such houses. Camp houses, his mother had called them. Trembling, he imagined his house empty, the hollow deserted and dark. His home had always been *intended* to be temporary. His whole world was temporary, and would expire like a school term—but no one would ever come back. Everyone was looking forward to the end.

[Go to Table of Contents](#) |

2

"What's the matter?" Joe Sorby asked in a tone of mild concern.

Max stared down at his dinner, knowing that his father would never understand.

"Well, what is it?" Joe asked again.

"Nothing," Max replied, looking up.

His father smiled at him as if they were about to share a secret, then shifted his stocky body in the chair.

"You've seemed sad for some time," his mother said gently. Max looked into her large brown eyes, so much like his own that he often felt he could read her thoughts.

Joe scowled. "Oh, come on, talking won't hurt."

How could his parents understand? They had grown up with millions of people around them. They were going back to places they knew. Even Rosalie, who had been born on Bernal One, the large habitat in the orbit of Earth's Moon, was used to many thousands of people, and she had visited Earth and the Moon.

Max had no idea if any of the other kids felt as he did behind their show of looking forward to coming home, of visiting all the places and things they had read about, seen in films, videos, and holos, or been told about by their parents. Some of them had to be faking, but he wasn't close enough to any of them to know how they felt about most things. Even Muhammad Bekhter, still often mistaken for his best friend, was only someone he had studied and cycled with a few times. Max had never tried to be a real friend, and Muhammad had naturally started spending more time with others. Max couldn't believe that some of them weren't upset by the fact that their home would soon be taken away from them.

Not that there was really any way for him to find out. If he admitted his own fears to someone else, he might only end up with the others mocking him, and with even more assurances from his parents and other adults that everything would be just fine.

"Max," his mother said in a firm but still kindly voice, "tell us what's wrong. We'll try to understand."

They meant well, but they wouldn't understand. The ship-habitat had been built for a purpose that was now almost achieved, and soon it would be time to do something else. They would say he was being backward and selfish, unreasonably attached to something no one should have this much feeling about.

"I know it shouldn't bother me," he said finally. "We've all been looking forward to the return." He paused suddenly, his throat dry, and said bitterly, "But not me. You all came from there..."

Joe was looking at him intently. "I had no idea you felt this way."

"It's not fair!" Max blurted out. "I never had any say in it." He took a long sip of water, unable to go on.

"I understand," Rosalie said. "You grew up here, and now it's going to be taken away."

Max nodded, feeling ashamed.

Joe sighed. "I see you've thought about this, but it's really nothing to get upset about. Back on Earth, kids who grew up in small towns were often afraid of moving to big cities."

Max took a deep breath. "Then why'd they have to?"

"Lots of reasons. Their parents had to relocate for work, or the kids had to go to school in a big city. Sometimes they ran away to the big city because they hated their small towns."

"I'm sure you'll like a bigger world," Rosalie added, "when you see what it's like."

Max swallowed and was silent. Great. They had it all backwards.

"We're just a small town, really," his mother said. "Don't you see that it would be wrong for you not to ever know anything else?"

"I suppose so," Max replied.

His parents were silent.

"We'll never come back here again," he added in a breaking voice.

"Who knows?" Joe said, leaning forward and patting him on the shoulder. "Maybe they'll use this place to go somewhere else. We've shown that it's pretty safe to live in. They'll refit it with better collision shielding, so it can get closer to light speed, and new people will move in and take it out again."

"You don't really think so," Max said, imagining strangers sitting at this table.

Joe shrugged. "It's possible."

"We'll never see this house again," Max added.

His mother smiled. "You know we can't decide any of these things. Did you think we'd live here forever?"

"Look, son," Joe said firmly, "we have no say in what will happen to this habitat after we return it, and there's no reason we should. The plan was to take it out and come back. We'll make new lives. One thing will end and another begin. I think you understand that. It will happen to you several times in the long life you'll live."

Max was silent, knowing they were right, but his feelings rebelled.

"Hey," Joe said suddenly, "we should be at the community center. The Sun's close enough now to show up bright, and the broadcasts will probably start getting through our interference tonight."

"I don't feel like it tonight," Max answered.

"Come on," his father said. "Everyone else is probably over there by now."

"There's so much that's happened since we've been gone," Rosalie said excitedly. "We'll have to work hard to take it all in. I mean, we know generally what's been going on, but it's like learning history—we'll know what happened, but never as if we'd lived it. We can't get back the time we lost. I feel apprehensive about coming back, but for different reasons than yours, Max."

"Just think, son," Joe said. "You'll be going from this small world to a much larger one. A whole Sunspace of worlds."

"But it's not right that we should lose our home, Dad."

"You're looking at it all wrong," Joe said impatiently, and Max knew his parents were thinking that he'd forget how he felt as soon as new things came along to distract him. "You can't hang onto your first home forever."

"We're late," Rosalie said, getting up from the table.

He would never forget, Max promised himself.

[Go to Table of Contents](#) |

3

They got on their bikes and pedaled toward the sunplate, Max on his racer, Joe and Rosalie on their two-seater, with Joe in the back. The light dimmed toward what his parents called moonlight. He pushed on ahead, making his best speed, feeling guilty that he couldn't share his parents' eagerness. He glanced at his father and saw the look of a stranger who might become angry.

The roads and walkways were empty. Almost everyone would already be at the center, anticipating that direct contact with Earth would come today. When the sunplate was only a few hundred meters away, it towered over the nearby landscape.

Max pulled up to the Community Center's bike rack. His parents caught up and parked their bike next to his. Together they walked into the ramp tunnel under the sunplate and came up into the amphitheater.

"We're the last ones in," Joe said as they entered the two-hundred-meter-diameter spherical space cut in the forward section of the asteroid. The lower half of the sphere cradled two thousand seats, but more than five hundred were now empty because almost that many people had chosen to stay behind in the new habitat at Centauri. The great center space was already aglow as Max and his parents took seats at the end of the top row in the first section. The center space was for projecting plays, educational programs, operas, ballets, old films, videos and holos from Earth, as well as for display of information during Town Meetings. The much smaller chamber of the Control Bridge was just above the Community Center.

The glow in the great space meant that the forward view was picking up the countless collisions with gas and dust in the deflecting shield's field as the habitat slowed from two-thirds of light speed.

They were in Earth's outer Sunspace now, perhaps already inside the orbit of Pluto. Transmissions from Earth would be coming in at any moment. Some news of the last thirty-six years had reached the habitat during the years at Centauri, but clear reception of radio signals was difficult during acceleration and deceleration.

The view cleared, and stars shone in the great hollow. A map grid flashed on, marking Earth's Sun. Not very impressive for the center of a complex civilization, Max thought as he looked at the yellow star. Earth, home to ten billion people, was a world of great cities and thousands of smaller communities, of oceans, rivers, mountains, plains, deserts, lakes, polar caps, hurricanes, tidal waves, dust storms, and long-dead civilizations. Luna, Earth's moon, a great industrial and scientific center, was home to nearly two million people. L-4 and L-5, positions in the Moon's orbit, were stable locations for a growing armada of space habitats. Among them was Bernal One, the large sphere where Max's mother had been born and raised, and where his father had gone to college.

Second from the Sun was Venus, which was being studied in preparation for terraforming—a process that might make the hot, cloudy planet another Earth in a century or two. Close in around the Sun was Mercury. Its asteroid habitats were home to a thriving community of miners. Joe and Rosalie had helped build the first habitat there before they joined the Interstellar Project.

Outward from Earth was the Martian colony, with its great spaceports at Deimos and Phobos, the planet's two moons. Nearly three million people lived in large agricultural domes on the desert that was being reclaimed along the old natural waterways. One day Mars would be terraformed into a world of forests, rivers, lakes and seas. The old dream of fully occupying the three planets of the solar system's temperate zone would be fulfilled.

Beyond Mars, habitats orbited Jupiter and Saturn. Max's habitat had been built around Saturn's moon, Titan. Mobile habitats had explored the outer solar system right into the Oort Cloud of cometary material, so it had been a natural step to send a habitat out to the nearest star.

Nothing of this great Sunspace civilization showed from Pluto's orbit. All his life Max had been learning about it, studying its works, seeing holos of its locales; but it had never been as real to him as the house in which he lived, or the paths he walked in the green hollow; not even as real as the worlds of Centauri.

"WELCOME HOME!" a male voice boomed from the starry space, startling Max. His mother gave him a look of concern. He felt anxious, but he smiled at her and tried to look interested. She patted his left hand, and suddenly he wished that Earth and its Sunspace civilization would disappear.

"ARE YOU RECEIVING US? THIS IS TITAN DOCKS. DO YOU NEED ANY ASSISTANCE? WE CAN SEND TUGS OUT TO MEET YOU."

"No help of any kind is required," Linda ten Eyck answered at the communications console. "We will

arrive in eighty-nine days."

As Navigator and Life Support Systems Specialist, Linda was the closest thing the habitat had to a captain. Joe had once joked that it would take two dozen experts jammed into one body to make a captain. A team working through an artificial intelligence was more efficient. But even though Linda was part of that team, she tended to assume more responsibility than the others. She loved her job. Some people said that she would be lost without it.

Max noticed Emil and Lucinda sitting in the first row with their father, Jake LeStrange, just below the platform on which their mother stood. Lucinda, Max realized, had let him off easy today. A month ago he had been standing around awkwardly at a party, trying to strike up a conversation with a few of the other boys, when Lucinda arrived with Emil, entering the room as if she were doing everyone a favor by coming. She had smiled and walked toward him. "I wasn't smiling at you," she had said before he could say hello, moving away with Arthur Cheney. Everyone had laughed at his mistake, although Emil had given him an unexpected look of sympathy. Humiliated, Max had left. "You should have stayed," his mother had told him. "They would have forgotten the whole thing in a few minutes."

Lucinda and Emil argued a lot with each other, and with anyone else who would let them. They sometimes berated Max because he hadn't yet chosen a field of study. Physics was their big choice. Emil was sometimes fun to talk to, but he would shut up and become another person when his sister showed up. She was Max's age, only a year and a half older than Emil, but she bossed her brother around. Max had once told him not to trail around after her so much. "Don't ever listen to him," Max heard her tell Emil. "He's asleep every afternoon. You'd think the son of a maintenance engineer would be more practical." Max had known then that she had seen him lying down by the waterfall. Lucinda would consider that a total waste of time, a sign of laziness and lack of ambition. No one would ever catch Lucinda idling away part of the day when she might have been studying or doing something constructive.

"YOU ARE NOW RECEIVING A SUMMARY OF MAJOR EVENTS FROM THE LAST THIRTY-SIX-YEARS," the booming voice continued, "CONTINUING FROM THE TRANSMISSION THAT WAS BEAMED TO COINCIDE WITH YOUR ARRIVAL AT CENTAURI."

"We are receiving," Linda replied, sitting down before the console. "Exploration of Centauri A, B, and C was completed productively, and the new habitat established. One hundred four children were born before our arrival at Alpha Centauri, and these are all returning with us. One hundred sixteen were born after the new habitat became livable, and they have remained at Centauri. We've had sixty-four deaths, three of them from accidents. Otherwise our community is healthy and thriving..."

Even at light speed, it would be over four hours before Linda's reply reached Titan, and nearly six before Earth heard it. Each side had only started the flow of information that would continue as the habitat made its final approach. It was not a real conversation.

"We're down to about 750,000 kilometers per hour," Linda said.

"We're just crawling along now," Joe whispered at Max's right.

"GREAT CELEBRATIONS ARE READY TO START ON YOUR ARRIVAL," the voice from Titan boomed. Max glanced at Joe, then at Rosalie. His parents were staring intently into the great space, and he knew that they had forgotten his problem; they were remembering people and places he had never known.

"We report no evidence of intelligent life anywhere in the Centauri system," Linda said.

Lucinda and her mother looked alike, even though Lucinda wore her red hair long, and her mother had it up in braids. Linda's green eyes were friendlier. Mother and daughter were often mistaken for each other from a distance, especially in shorts, which showed off their long legs. Max had been fooled a number of times, feeling relieved when he encountered Linda instead of her daughter. On one such occasion, the Navigator had put her arm around his shoulder and walked with him down the road to the library, telling him what good friends she had been with his father on Bernal One and Mercury.

"However," Linda continued, "the heavily forested fourth planet of Centauri A is home to small monkeylike bipeds. They will be observed more carefully by teams from the habitat. Construction of the new habitat from a suitable nickel-iron asteroid went routinely. The community should be thriving by now...."

Emil was chubby, and his father was thin, but there was a similar look in their dark brown eyes, and in the slightly arrogant way they held their heads. Emil's brown hair was long, Jake's always shaved down to a stubble.

Lucinda shifted her crossed legs to one side. Max stared. She never looked back even when she knew he was staring at her. He felt foolish about being attracted to such an obnoxious girl.

"WE HAVE IMPORTANT NEWS," the voice from Titan cut in. "IN 2081, WE SENT A SMALL MOBILE WITH A TYPE II PUSHER DRIVE OUT INTO THE COMETARY HALO BEYOND PLUTO TO INVESTIGATE WHAT SEEMED TO BE THE SOURCE OF A SIGNAL. THE EXPEDITION FOUND AN ALIEN RADIO TRANSMITTER. BY THAT TIME OUR NEW TACHYON PARTICLE DETECTOR WAS OPERATIONAL. IT SHOWED US THAT THOUSANDS OF FASTER-THAN-LIGHT COMMUNICATION CRISSCROSS THE GALAXY. A NUMBER OF THESE TACHYON LINES PASS THROUGH OUR SUN, FOR REASONS WE DO NOT UNDERSTAND. THE GALAXY IS ALIVE WITH CIVILIZATION AND WE CAN'T SPEAK TO ANY OF THEM!"

"Not yet, anyway," his father whispered.

"IT'S AS IF THE RADIO BEACON HAD BEEN A SMOKE SIGNAL, SENT UP BECAUSE WE WOULD BE SURE TO NOTICE IT, BACKWARD AS WE ARE. DECODED INTO A PICTURE STORY, THE SIGNAL SHOWED US THE DANGER OF INFALLING COMETS FROM THE HALO. WE'RE NOT ALONE IN THE GALAXY. YOU ARE RETURNING AT WHAT MAY BE A TIME OF GREAT DANGER AND NEW POSSIBILITIES ."

"Just think," Joe whispered excitedly, "there are probably a million times more aliens out there than all the people in Sunspace. What do you think of that, Max?"

Max had studied the possibility of contact with aliens, but had always imagined it happening in the far future. This news was strange, because there had been no actual two-way contact, only the discovery that alien cultures existed and seemed to be unaware of, or uninterested in, humankind.

Linda sat back at the console, waiting.

"We've been topped," Joe said softly. "Our return isn't the biggest thing going."

"I wouldn't worry too much about it," Rosalie said, sounding critical. She often kidded Joe. Sometimes Max didn't understand what the joke was, and felt left out; but he knew that his parents were best friends, even when they disagreed.

As he looked around at the hushed gathering, Max noticed students from his class in the lower rows.

Muhammad sat with his father and brother, Jane and Alice Sanger between their parents. Tutor Jonney sat alone in the first row. Everyone was staring at the small yellow sun in the center space. A new time was coming, he realized, not just for him, but for the whole habitat, and maybe for all human beings. He wished that he could be happier about it.

"BY NOW YOU SHOULD BE RECEIVING THE ENTIRE COMPRESSED TRANSMISSION OF EVENTS FROM THE LAST THIRTY-SIX YEARS," the voice from Titan said suddenly. "THIS WILL GIVE YOU ENOUGH BASIC DATA TO REORIENT YOUR POPULATION BEFORE ARRIVAL."

"Receiving," Linda replied, and the sound of conversation returned to the amphitheater.

"There'll be plays and films," his mother said, "and new books, dances and newscasts. More than we can ever catch up on." She was silent for a moment. "It's almost as if we've been dead all this time, and now we're coming back to life."

"Don't worry," his father said. "A lot of what we've missed is probably junk."

"What *you say* is junk," Rosalie replied.

Max saw his father smile. "It's strange," he continued seriously, "to feel accountable to people back here, many of whom weren't even alive when we left. All this time has made us feel independent. Makes you think it would be possible to start fresh somewhere else, with just a few people."

"Now you sound like Max," Rosalie asked. "Aren't you curious, and glad to be back?"

A look of uncertainty came into his father's face, and Max felt closer to him. Who were these people of Earth? Why should they have control over what happened to his world? Maybe his father understood him after all.

"Just a feeling," Joe said. "We're home."

Max felt betrayed. "Why can't we just go away and live on our own?" he asked suddenly, his voice carrying. People turned around to look at him. There was Arthur Cheney, with his usual mocking grin. Muhammad made a face, then poked his brother Hussein in the ribs. Lucinda turned her head and shot him a look of contempt. Max glared back, but she had already turned away.

"We could go off on our own," his father replied gently, "but that's not what was planned. You know that."

"We left a habitat at Centauri," Max objected.

"That was planned."

"Maybe I should have stayed there."

"But you deserve to see Earth," his mother said, looking at him with dismay.

"You'll feel differently when you see things for yourself," Joe added. "I promise."

Max looked away. His feelings didn't count. Rosalie touched his hand; Joe reached over and ruffled his hair. Everyone else seemed to know what was best for him.

Linda ten Eyck stood up from the console and looked around at the assembly. Then she paced back and forth, stopped finally and in a quavering voice said, "I'd like to thank all of you for the help you've given

me all these years. We haven't always agreed, but my ... our team could not have functioned without your suggestions and skills. I know that some of you may be feeling sad that our worldlet is about to rejoin a larger one. We were privileged to feel for a time as if we were all of humankind, and it will be hard to lose the sense of independence that was ours."

Joe nudged Max. "See," he whispered, "you're not the only one."

"I hope," Linda said in a stronger voice, "that we'll keep in touch in the years ahead, and that perhaps some of us will have the chance to work together again." The Navigator was silent as she gazed up at the people around her. Max saw that she was very moved.

"I've never seen her like this," Joe whispered to Rosalie. "Didn't know she had that much sentiment in her."

"She's saying good-bye to a lot," Rosalie whispered back.

People began to applaud. Many stood up, shouting their appreciation. Max looked up at the image of Earth's Sun, which now seemed brighter.

Suddenly, the holo of the forward view flickered. Linda went to the console and made adjustments, but the flickering persisted. The stars winked in and out. The image of the Sun brightened and grew larger in steps, as if the habitat were rushing toward it in large jumps.

"The whole board's dead," Linda said to a silent chamber. "It's not possible!" she shouted. "We can't be that close."

The Sun was now a white-hot ball in the center space.

Max turned to his parents. Joe stared. Rosalie's eyes were wide with fear.

"We're heading right into it," the Navigator said grimly.

[|Go to Table of Contents |](#)

4

The Sun grew larger and brighter.

Max felt his mother's hand in his, squeezing. Joe put his arm around his shoulders. People cried out in astonishment as they realized that somehow, in a few minutes at most, they would be vaporized. It was impossible that the habitat could have traveled from the outer fringes of the solar system in so short a time, and was about to fall into the Sun. It had to be a bad dream, Max told himself.

More than half the viewspace was now filled with the shimmering photosphere. Cancerous black spots waged war with swirling storms of plasma. Prominences shot out into space. People moaned and whimpered as the giant's fiery tongues tasted the habitat.

Max looked at his mother. Her eyes were closed as she held his hand. His father's arm was a vise around Max's shoulders. "Can't be," Joe whispered.

Max tensed against his father as the Sun's image faded to a gray ghostliness.

"A malfunction in the holo unit," Joe said in a trembling voice.

Linda worked the console, but the view was unaffected. She looked up, then said something through the intercom on the panel. A voice answered faintly.

The ghostly hemisphere of the Sun disappeared. Linda sat back, then swiveled to face the gathering.

"That is the external view," she said. "The universe seems to have vanished from around us."

As Max gazed into the strange grayness, he realized that somehow his wish had come true. Everything he had feared was gone. The habitat was on its own again.

A murmur passed through the chamber.

"Is this a joke?" Muhammad's father demanded.

"It must be!" a woman shouted, laughing.

"Sure—it's a homecoming prank!" a man shouted from the back row.

Linda ten Eyck stood up. "No," she said softly.

In the silence, Max felt a slow rhythm, as if another heart were beating inside his own. He looked at his parents.

"I feel it," Rosalie said.

"So do I," Joe added.

People were speaking to one another, or clutching at those nearest them, and Max knew that they were all feeling the rhythm inside themselves.

"Something's very wrong," Rosalie said.

"We're being pulled forward!" Linda shouted.

As Max gazed into the gray holo, he sensed that something was waiting up ahead in the alien space.

Jake LeStrange got up and hurried over to the console, where Linda was leaning forward, talking to the control bridge through the intercom. He whispered something into his wife's ear. Emil and Lucinda sat very still in the first row. Max took a deep breath and listened to the intruding, alien pulse within himself.

A giant black globe appeared in the gray space. The gathering cried out in fear and wonder.

"Oh, God!" Rosalie exclaimed.

The black globe hung in the gray void and seemed to pulse with energy. Long cables floated out from it. This, Max realized, might be the source of the beat they all felt.

"The object ahead," Linda said, "is a hundred kilometers in diameter. Our drive is dead. We can't turn away."

The globe grew larger. Max glanced at Joe and Rosalie. They were staring at the holo with dismay.

An opening appeared on the black globe's equator. Dazzling white light shot out.

"We're being pulled in," Linda said as the globe covered the entire view. The opening glowed white-hot, as if from a furnace, and the viewspace turned completely white. "No danger signals from our life-support

systems," Linda said. "Only our drive is out."

"Something wants us," Joe said, shaking his head.

"But who?" Max asked, wondering what had happened to the Sun.

Joe let out a nervous breath and looked baffled. "Are we being hijacked?" Max asked, feeling both curious and fearful.

The white light filled the amphitheater, making everyone very pale. Max looked at his hands. His veins seemed almost black in the glare.

The holo winked off.

"We've stopped," Linda announced to the silent chamber. It's swallowed us, Max thought.

After a long silence Linda said, "I think you should all go to your homes and wait as calmly as you can. We don't know what's happened. Announcements will be made as we learn more. There's no point in waiting here."

"Let's go," Joe said as he stood up.

People stood in the aisles and stared up into the dark viewspace. Max noticed that Emil and Lucinda were at the console with their parents. Suddenly Lucinda looked up toward him, her eyes wide with fear, no longer the confident person he had known.

"Come on," Joe said. Max followed with his mother. They joined the crowd moving toward the ramp, and in a few minutes emerged into the nightglow of the hollow. A gentle breeze stirred across the inner countryside. The habitat was still the same; it seemed impossible that anything could be wrong.

Joe was silent as they came to the bicycle rack. Max saw his mother's hands shake as she grabbed the handlebars and rolled out the bike. Suddenly he knew that for him home was just up the road; but for his parents it was another place they carried inside them, however strange that seemed to him, and he had told them that he wanted no part of it.

"Why did this happen?" Rosalie asked, her voice trembling. Joe sighed, then laughed nervously. They pushed off, turned on their headlamps, and pedaled up toward the rise, staring ahead and gripping the handlebars.

Everywhere in the hollow people were hurrying to their houses. They walked or rode bicycles and small vehicles along the walkways and roads of the inner surface. Max glanced overhead and saw house lights winking on. People were silent as he pedaled past them; worried faces stared back at him. Everything he had feared seemed suddenly unimportant.

They sat silently in the living room, Joe in his chair, Rosalie on the sofa, and Max cross-legged on the carpet.

"All the planning and effort," Joe said bitterly. "All these years of success, and now this!"

"Is it some kind of accident?" Rosalie asked. "Did we do something wrong?"

"I don't think it's anything we did," Joe said.

Max tensed, imagining that something had set a trap for his world.

Joe stood up suddenly and stuck his hands in his coverall pockets. "Makes no sense at all!" He shook his head. "My old friend Morey would go nuts over this. He'd say we were all dreaming, and try to wake himself up." He glanced at his timer. "Have to get to my nine o'clock shift." He looked at Max, then at Rosalie. "Try not to worry. We must keep up our routines."

"We're prisoners, aren't we?" Max asked.

Joe sighed nervously and clenched his right hand. "I'll be back as soon as I can."

"Where will you be?" Rosalie asked.

"The maintenance teams will probably be at the drive housing, checking to see if this could have been caused by some kind of malfunction."

"Who are we kidding, Joe?" Rosalie said suddenly. "We're not lost, and there's nothing wrong with the habitat. We're inside a giant sphere. Someone built it, and it's not anybody we know."

Joe nodded. "Both of you try to get some sleep while I'm gone."

Who would want to capture us? Max wondered as his father hurried away.

[Go to Table of Contents](#) |

5

Unable to sleep, Max tossed and turned in bed. He dozed for a few moments, then fell from a high cliff and woke in a sweat, seeing his world trapped inside something bigger. What was the big sphere, and where was it? Who had made it, and for what purpose?

A gentle breeze blew into his room. He got up and sat in the open window to cool off. The inner countryside was peaceful in the nightglow. He looked up at the houses overhead, half expecting them to tear loose and float into the center space. Whenever he thought of Earth curving the other way for thousands of kilometers, with only a thin layer of air protecting life from space, the hollow and the levels around it made him feel safe; but now he almost wished that he were on Earth, which he might never see because something had swallowed his habitat.

What was outside? Was something waiting there, preparing to tear the habitat open? He imagined giant alien machines ripping through the asteroid's crust, looking for the small human creatures within. What did the aliens want? Had they set the giant sphere as a trap?

Suddenly Max wanted to explore outside the habitat. Then, just as suddenly as it had come into him, the impulse died. He leaned back against the window frame and closed his eyes for a moment, then opened them and saw two figures coming up the path to his house—Emil and Lucinda, dressed in shorts and hiking shoes.

What were they doing out so late, and why were they coming to his house? They came to his window and looked up, as if they expected to find him sitting here.

"What is it?" he demanded in a whisper.

"Come out," Lucinda said.

"What for?" Max asked, trying to see their faces in the nightglow. It was a prank of some kind, he

thought, then realized that even they wouldn't be trying to fool around at a time like this.

"Hurry!" Lucinda shouted.

Max hesitated. "Do you feel it, too?" he asked. "What's going on?"

"We're not... sure," Emil said. "I want to see what's outside. *I have* to see what's there!"

It was not a prank, Max realized. Something was very wrong with all three of them.

"I'll be right out." He went inside, found his shirt, shorts, and hiking shoes, and dressed quickly, then put on his coveralls. He usually wore them as extra protection when his father took him along on his maintenance route in the narrows of the engineering level. Where was he going now? It didn't seem to matter.

He went back to the window, sat with his feet over the edge, and jumped the two meters to the ground.

"Well?" Max asked.

Emil turned away and started down toward the main road. Lucinda followed. Max hesitated, then marched after them.

"Where are we going?" he asked as he caught up.

He got no answer.

"Come on, Emil, where to?" He quickened his pace until he was walking between the pair.

"Outside... I think," Emil managed to say.

"What?"

"Something wants us outside," Lucinda said firmly, as if trying to convince herself.

"But we'll be stopped," Max objected, feeling dreamy and lost.

"Emil knows a way out that isn't used much," Lucinda explained without looking at him.

"As soon as we open a lock," Max said, "it'll show up on the watch displays."

"We'll be gone by then," Emil replied.

"We can't!" Max protested. "We have no idea what's out there."

Despite his protest, Max kept pace with them, now half unwilling and half unable to stop himself. He looked at Lucinda's narrow waist and bare legs, expecting her usual glare of contempt, but she only stared ahead.

"We both dreamed of being outside, in the sphere," Emil said. "Didn't you?"

"No," Max said with a sinking feeling, "I didn't."

"But you were in our dream," Lucinda added in a cold tone.

"That's why we came to get you," Emil said. "We've got to go, and you have to come with us."

"Are you afraid?" Lucinda asked,

"No, I'm not," Max answered, trying to keep up with her. "I feel the things you do, but what is it?"

"We'll find out," Emil said, "and we'll be the first. Aren't you curious?"

Max swallowed hard. Sweat ran down his face as he marched. He felt as if he were sleepwalking, and wondered why he couldn't just turn around and go home. It reminded him of when he had been little and would follow his parents anywhere.

"Where's this way out?" he asked.

"Behind the sunplate," Emil said. "There's a tunnel that leads out at the end of the long axis. The locks open and close manually."

Max looked up at the glowing sunplate. His father had mentioned such exits. They were there because the designers had believed there should always be manual backups for all automatic systems.

Max wanted to go, but tried to resist. "Maybe we should tell someone," he said.

"We've got to go by ourselves, Max," Lucinda said as if reading his thoughts. "Can't you tell it's important?"

"Yes," Max heard himself say. The words seemed to come from a distance, as though they had been spoken by someone else.

The sunplate grew large ahead of them. Time raced. Max's heart beat faster as he kept up his pace. He looked around the darkened hollow, experiencing it with heightened senses, breathing the cool air and smelling the soil and greenery as if they were alien things. He felt as though at any moment his body would grow large and burst through to some greater world outside.

Emil and Lucinda stopped just below the sunplate. Max caught up. It towered above them, balanced dangerously, its moonlight turning the grass around them black. He looked back at his house. Its lights were on, and he knew that his mother had awakened and found him gone. She would be calling his father at work by now.

"Under here," Emil said, dropping to his knees. Max and Lucinda watched as he crawled under the rim of the glowing sunplate. She followed. Max glanced back at his distant house, then dropped down and crept after her.

"I'll have the utility light on in a moment." Emil's voice echoed down the tunnel.

Finally, a red light went on, and Lucinda's dark shape rose up in front of him. He stood up and followed her to where Emil was cranking open the first lock.

"Come on," Emil said, and squeezed through the partially open door. Lucinda went after him. Max slipped through after her.

Emil was already cranking the next lock. When it was open just enough to get by, he went through, and Lucinda disappeared after him. Max followed, feeling vaguely surprised that they wanted him along as he went down a long stretch of tunnel cut smoothly through the rock.

"Here's the outer lock!" Emil shouted, grabbing the crank.

"Don't!" Max shouted, peering ahead in the red light. He rushed forward, feeling as if he had just

awakened.

Emil and Lucinda waited for him in silence.

"All the locks are open behind us," he said. "If there's no atmosphere outside, we'll be sucked out, and the habitat will start losing air."

Emil turned the crank. Max wanted to stop him, but couldn't. His mind knew the dangers, but his will was quiet. He took a deep breath, expecting decompression, but the door only slid open.

Emil went through. Lucinda blinked, then went after him.

Max followed, feeling confused. The tunnel turned ninety degrees to his right, and he saw Emil and Lucinda in a circle of white light. They disappeared into the glare. Somehow, there was air outside the habitat. The giant sphere had been built by oxygen-breathers, whatever else they might be, Max thought. Or maybe by beings who were expecting to trap oxygen-breathers.

The light dazzled him as he came to the opening. Then, as his eyes adjusted, he saw Emil and Lucinda below him, standing on what seemed to be an endless glass floor. Blue-white light was everywhere, even coming up through the floor. Emil and Lucinda stood as if something had frightened them into immobility.

"What's wrong?" Max called.

Emil looked up at him. "I'm not sure," he said. "This surface is disorienting." His sister stared at the floor. "Is it safe?" Max asked.

Emil nodded. "Jump down."

Lucinda looked surprised, as if she had just awakened.

Max stepped out from the opening, and landed next to her. She backed away from him in fear.

"What is it?" he asked.

She shook her head and closed her eyes in dismay. "I don't know."

The floor seemed solid enough to Max. He peered into the hazy brightness, then turned around and faced the habitat. It loomed above them, its gray, rocky surface looking out of place on the clean floor. Part of the great mass seemed to be cradled below the surface.

"So, what now?" he asked, turning to Emil.

"I'm not... sure," the boy replied. "One thing's wrong. The habitat isn't spinning now, but we had normal gravity inside. Something is maintaining it—and it doesn't feel different out here, either."

Lucinda still seemed disoriented. Max looked at her with concern. Eyes still closed, she seemed to be listening to the silence.

"What do you hear?" he asked.

"We've got to go that way," she said, pointing away from the habitat.

"Why?"

Her eyes opened, and she looked directly at him. "I don't know, but something wants us there."

6

As they started across the bright floor, Max felt that he had to keep going. He came to himself suddenly, stopped, and looked back at the habitat. Emil and Lucinda walked on. "Wait!" he shouted after them.

They halted and looked back. Lucinda seemed dazed; Emil shook his head. They hurried back to him.

Max stared at the habitat. As far as he could see to his left, its five kilometer-long mass was more than half submerged in the smooth floor, trapped like a rock in ice. He looked up, searching the brightness for a ceiling, but could not see beyond the blue-white glare.

Again he felt unsteady, as if he were trying to wake up. Emil staggered and reached for his sister's hand.

"We've been lured out here," Lucinda said in a trembling voice.

At any moment, Max expected the beings who had built the sphere to appear.

"Who are you?" he shouted. There was no answer, not even an echo.

"So what now?" Emil asked.

"I think they want us to go in that direction," Max said.

"But who are they?" Lucinda asked.

"Nobody we know," Emil answered.

"What will they do if we don't obey," Lucinda said, "force us again?"

"They could have just forced us all the way," Max replied, "but they don't seem to want to do that."

"I'm not so sure," Lucinda said. "And why did they pick us and not anybody else?"

"Then let's go home," Max said.

Emil looked uneasy. Lucinda turned and gazed into the bright distance. "Maybe we should explore," she said. "It might be important."

Max felt queasy. He didn't like the idea of something probing his mind and bending him to its will. He was tempted to turn back, just to see if the strange compulsion would seize him again.

"Lucinda's right," Emil said. "We should find out what's going on."

Max nodded, realizing that they no longer had to be pushed. Were the aliens that clever and knowing about human beings? "All right, we'll go," he said. Lucinda pointed. "It's still that way."

Max went ahead. After a while, they stopped and looked back at the habitat, now a dark, mountainous outline in the blue haze.

"Look!" Lucinda shouted as they turned away.

Max strained to see ahead, and made out a tall column. He moved forward slowly, noticing that the structure seemed to have no top, but just went up into the brightness and disappeared.

As they approached it, Max saw that the giant column was transparent. Stormy gray and white stuff roiled inside. They came up close and touched the smooth, cold surface. Emil circled the structure and reappeared at Max's left.

"It's about twenty-five meters around, he said.

"But what is it?" Lucinda asked.

Max looked up at the endless column and felt fearful. He turned back toward the habitat, but it was hidden in the brightness now. "Remember," he said, "the habitat is back that way."

"What is this thing *for*?" Emil said, clearly fascinated by the column.

Max sat down against it, so he would face toward the habitat. Lucinda came and stood over him.

"Where is all this? Why is the habitat here?"

Emil dropped down next to him. "This is great, isn't it?" he said with a nervous laugh.

Lucinda sat down cross-legged in front of them. "Something wanted us out here. Or was it just us?"

"Come on," Max replied. "If this is something you two wanted to do for yourselves, I'm the last person you'd take along." He looked into her green eyes, expecting her to nod scornfully in agreement, but she looked away.

"You're right," she said apologetically. Max stared at her, surprised that she had taken him seriously.

Emil jumped up impatiently. "We're supposed to explore."

Max was still looking at Lucinda when she made a choking sound and pointed behind them. He jumped up and saw that openings had appeared in the column.

"There's twelve," Emil said as he went around and came back from the right.

Each was a perfect square of blackness. Max stepped into one square, drawn by its strangeness, then forced himself to back out, feeling somehow that this was not the right one.

Emil and Lucinda were gone.

"Where are you?" he shouted as he hurried around the column. He halted before an opening, then realized that they might have entered any one of the portals, and that he had lost his bearings by circling the column in panic. He hesitated, then decided that he would have to start somewhere.

"Emil! Lucinda!" he shouted as he stepped into the blackness. It seemed to flow around him, as if it were liquid. He went forward and drifted to the right, sensing the curve of the passage. He stopped suddenly, feeling lost, and backed out again into the light, emerging just in time to glimpse Lucinda as she disappeared into the next entrance.

"Wait!" he shouted, but she ignored him, as though she knew where she was going and didn't care about anyone. He went in after her, and again veered to the right through the flowing darkness. He slowed his pace, reached out, and touched a shoulder.

"Lucinda?"

"It's me," she said.

"Were you trying to lose me? Why are you standing here now?"

"Waiting for you. We have to go through this way."

"Where's Emil?"

"Up ahead."

He slipped his hand into hers. They went forward and bumped into Emil, who moved away.

Lucinda pulled Max along.

"Do you feel strange again?" he asked.

Her hand tightened in his. The cold odorless blackness flowed around them. Max felt as if he were breathing it.

"There's an opening!" Emil shouted as they came around the curve.

Max peered ahead and saw a square of light. Emil's dark shape appeared in it and went out through the exit.

Max and Lucinda rushed forward and emerged into a yellow-lit space. Emil was just ahead.

"We're in a dome of some kind," he said as he faced them. "Look at that!"

Max turned to look at the column from which they had emerged. Glassy, but smaller than the one they had entered, it also rose up into a glowing haze.

Suddenly the yellow light faded. A night sky appeared, with two alien suns setting on a ragged horizon of black mountains. One sun was a white-hot oval, the other a yellow dwarf, also egg-shaped from the distortions caused by mutual gravitational attraction. Rings of glowing red gas spiraled out from the two suns. Max squinted as his eyes adjusted. A great rocky plain surrounded the dome.

"Where are we?" Lucinda asked, letting go of Max's hand.

"Not in Earth's solar system," Emil said, "that's for sure."

"But how did we get here?" she asked.

"Through the passage," Emil answered, "from wherever the giant sphere is, I guess."

"What do you mean?" Max asked.

"Well, our habitat is inside the giant sphere, which is probably somewhere in Earth's Sunspace, I think. When we stepped into the column, it took us to another star system, through some kind of interstellar short-cut. The columns must be a transit system of some kind."

"Maybe not," Max replied. "It could be that this is where the giant sphere is, circling these suns, and we only went from the sphere to this planet."

Emil nodded. "Could be, but it seems more like a bridge system, even if it only took us from the sphere to this dome."

"But that would mean that the sphere captured our habitat and then came here," Lucinda said, puzzled.

They gazed out at the bleak world around them. Max had seen holos of massive double stars, but to stand in the real glow of these suns was eerie. Two stars were locked in a fiery embrace, exchanging rivers of plasma along gravitational and magnetic lines.

"We should go back," Lucinda said, breaking the spell as she retreated toward the column. Max felt her fear. A sudden deep hum sent shivers through him.

"Look!" Emil cried.

The openings in the column were blurred by its speed of rotation. "What's happening?" Lucinda shouted.

The hum became a roar, then shifted into a high-pitched whine. Max began to feel dizzy from the sound.

Slowly, the whine died away. The openings became clearer and stopped. The stormy mass inside roiled lazily.

"Which is the right way back now?" Lucinda asked.

"No way to know," Emil said with dismay.

[Go to Table of Contents](#) |

7

"Maybe they all lead back to where we started," Lucinda said.

Max shook his head. "Fat chance."

Emil pointed at the portal in front of him. "Maybe it's this one."

"Let's try it," Max said.

"We'll split up," Emil offered suddenly. "Each of us tries one portal, then we meet back here."

"That's dumb," Lucinda answered. "We might not all wind up back here. These things could go anywhere. It's better to try each one in turn, together."

Emil looked embarrassed. "Right. I wasn't thinking."

"Stay close," Max said as he went in.

Emil and Lucinda were right behind him as he followed the S-curve. The darkness flowed around him, guiding him through. Light flashed ahead, and Max paused. Emil and Lucinda came up on his right as he approached the exit.

"The air smells strange," Emil said.

"Ozone," Max said. "Too much could be poisonous."

"What?" Emil said fearfully.

"Wait," Max said. He turned and looked back, trying to see by the flashing light, then moved to the right and touched the wall. It felt rocky. "We've come out into a cave!"

Emil and Lucinda were moving toward the opening. He hurried after them.

Black clouds rode in a white sky as they emerged onto a high place.

"It's so big!" Emil cried out in surprise at the size of the landscape, then moved toward the edge of the Cliff, with Lucinda behind him. Max's curiosity raced as he followed them. They were on the *outside* of a planet, where the surface curved the other way and might be millions of times larger than the interior of the habitat.

A shimmering green forest lay below the cliff. Wind ruffled the trees, whispering. Black clouds swirled in a white sky. Lightning struck the forest, setting fires. Max felt an overpowering sense of danger.

Emil stepped to the edge, then backed up and sat down, covering his eyes.

"Are you all right?" Lucinda asked.

"He nodded, eyes closed. "Makes me dizzy."

"I feel lighter," Max said, "so this planet's mass must produce less than our one gravity."

"So do I," Lucinda added, "but not by much."

A gust of wind blew raindrops into their faces. Max backed into some tall weeds that had grown out of cracks in the rock.

"We'd better go!" Lucinda shouted, helping Emil to his feet.

Lightning lit up the whole sky as they retreated from the edge. The black clouds bunched up into a solid blanket.

"Strange place for an exit," Emil said loudly, looking around. "It must have made sense once to have one here, maybe before erosion changed the land."

"Come on!" she shouted at him.

The clifftop trembled and pitched toward the forest. They staggered back from the cave entrance as the world lifted up and tumbled them toward the edge.

Emil cried out as he went over. Max grabbed the tall weeds and hung on. Out of the corner of his eye he saw Lucinda doing the same. The ground shook again, and the weeds came out by their roots. Lucinda screamed as she brushed against him and rolled over the edge.

No, Max thought as his weeds pulled loose. He tried to dig his fingers into the rock as he slid toward the edge. For a moment he hung there, but the next tremor shook him loose.

In a dream there would be time to look down and see where Emil and Lucinda had struck, he thought as he fell, and that would prove it was a dream, he told himself as he hit—and slid into something soft and wet.

Then his feet touched bottom, and he was standing chest-high in mud.

He heard a gurgling sound and turned to see Lucinda pulling Emil's head out of the mud. "Help me!" she cried. He pushed forward, struggling to make his way to her.

Emil was still breathing when he managed to get to them. Max helped Lucinda hold her brothers unconscious body upright as rain began to fall.

Max looked for a way out.

"What is it?" Lucinda shouted.

"We can't climb back up!" he answered.

"What happened?" Emil asked in a weak voice.

"We fell into this mud," Lucinda said. "How do you feel?"

"Okay," he gasped, struggling to see in the downpour.

"Anything broken?" Max asked.

"I don't think so." Emil moved his arms and stood by himself. "Which way?"

"To the bank," Max said. "Back up to the cave."

Emil and Lucinda pushed through the mud. Max followed, but it was hard going as the rain increased, and suddenly he could see nothing but the shapes of Emil and Lucinda. The rain in his ears was deafening. He forced his way to them, and they huddled together in the mud as lightning washed the world white.

He spoke into Lucinda's ear. "We can't stand this for long. We'll go deaf and catch cold." She coughed violently. "Are you okay?"

She nodded.

"Come on!" he shouted.

They pulled Emil along by his arms. The mud sucked at their legs as if it were alive.

Emil shook free. "I can make it!" he said.

The rain thinned, and Max saw that they were almost at the bank below the cliffs. The smell of mud was strong. Other, stranger smells mingled with the odor of the red clay. How had all this happened to him? Only a few hours ago he had been in his room. He might die here, and nothing would be left of him but wet bones, packed neatly in the clay.

He shook off the gruesome image and pushed harder. Emil and Lucinda fell behind. He slowed, and they caught up. Linking arms, they struggled onto the bank and collapsed on the stones and broken slate, then crawled closer to the clay wall for some shelter from the rain's bombardment. The clay, Max saw, was soft, and part of the wall might fall on them if the rain weakened it. He motioned for Emil and Lucinda to go back. Finally, they covered their heads with their hands and tried to rest.

The rhythm of the rain numbed Max as he floated near sleep, half thinking, half feeling. Images came to him at random. He was playing in the hollow, rolling down its grassy slopes, following a trail around the inner equator, hangkite gliding with the sunplate warm on his face. His mother called for him to come in, and her voice seemed to sing his name. Where was home now? It was trapped in a big sphere somewhere, and he was fighting for his life in another solar system, light-years away....

The rain stopped. He listened to the silence, then sat up and saw white mists twisting like lazy snakes over the stream that flowed through the gorge.

"We've got to get out of here!" he shouted suddenly. "The water's rising."

Emil and Lucinda sat up.

"Where?" she asked tiredly.

Max estimated that they were not far from where they had gone over the cliff. "We'll go downstream and find a way back up to the cave."

Emil said, "The quake might have closed it."

"I'm bruised all over," Lucinda said as she got up.

"My knee hurts," Emil added.

Max stood up, ignoring the ache in his shoulder.

"The water's still rising," Lucinda said as he led the way down the bank of pebbles and slate.

"This gorge might run for hundreds of kilometers," Emil said.

Max examined the clay walls on either side of them. "We have to climb out."

"It's too steep," Lucinda said. "Maybe it's not as bad farther down."

Max peered ahead through the thinning mists as he went along the bank, but the walls were nearly vertical as far as he could see.

He led the way around two turns, then stopped and went to the wall at his right, determined to climb up. "Follow me in the steps I make."

"They won't hold your weight," Emil said.

"I'll dig them deep," Max replied.

He scooped out clay with his hands, working at eye level. "Boost me up," he said to Emil when he had made two steps.

Emil sighed, but bent down and put his hands together. Max stepped up, clutched the wet wall, and put his right foot into one of the holes, then hugged the wall and got his other foot in. Blood pounded in his ears as he slipped in the softness.

"Told you," Emil said.

"Quiet!" Lucinda snapped as Max dug with his right hand. When the hole was deep enough, he shoved his hand in and began to dig with his left.

"I can't go up like that," Emil whispered to Lucinda.

"You'll have to," she said.

Max finished the second hole, pushed his hand in, and rested.

Emil asked, "How are you going to move from that position?"

Max breathed deeply, reached down below his waist and dug another foothold, then looked up and saw that it was twenty-five meters or more to the top. Climbing might be possible once the holes were dug—if he could dig them, if they remained firm, if he didn't slip halfway up and break his neck. . . .

He finished the hole below his waist and tried to step into it. He succeeded on the third try, but the clay gave way. He would not be able to lift himself by standing in it.

A roaring sound drowned out the pounding in his ears.

"Max!" Lucinda shouted.

He looked to his right and saw a wall of water rushing down the gorge.

[|Go to Table of Contents |](#)

8

Max slipped from the wall and landed on the bank just as the flood hit them. He tumbled and twisted, struggling to right himself in the rush, gulping muddy water as his shoes and clothing dragged him under. He surfaced choking and coughing as he gasped for air, treading water with all his strength to stay afloat. He looked around as the current seized him, but couldn't spot Emil and Lucinda. They had struck the wall and drowned, he thought, dazed.

The flow whipped him around. He sank in a panic and struggled to surface, holding his breath until his lungs were about to burst, then pushed up and broke through, sucking air as he twisted in the current.

He cried out with joy when he spotted Emil and Lucinda downstream. They were swimming furiously to escape being dashed against the gorge walls. Wearing shorts had made it easier for them to float. He watched as they bumped and scraped around the turn.

He struck near the same places, protecting himself as much as possible, then swam into center stream and was swept around the bend. Emil and Lucinda cried out to him. He waved back as they vanished into the mist, then was borne into the haze after them.

"Hello!" he cried.

"We're here!" Emil shouted back.

The current quickened. Max shot over a short waterfall and around another turn. He inhaled water through his nose and gagged, wheezing and sputtering as someone grabbed his collar and pulled him up against a rock.

"Stand up," Emil said.

Max found a handhold and touched bottom, breathing more easily. Emil and Lucinda looked frightened but relieved as they clung to the rock.

"We can get ashore," Lucinda said, shivering in the cooling air, and Max knew that they had to get dry before exposure killed them. Lucinda looked half drowned, but seemed determined.

"Link up," he said, taking her hand. She grabbed Emil's hand, and Max led them out from behind the rock. The water pushed at them, but the flood's force was weakening.

They staggered out on the narrow beach, dropped to their knees and stretched out on their stomachs. Max rolled over after a while and looked up at the gorge. "It's not as steep here," he said, sitting up.

"Not as high," Lucinda said through chattering teeth. "It's so much colder."

Max stood up. "We have to try now. No telling how long the nights are here." He hurried along the bank, picked a spot, dug out two steps in the wall and began to climb. The clay seemed firmer here, and was mixed with stones.

"You can dig with hands and feet!" he shouted, climbing by jutting his feet into the clay and scooping with his hands. He glanced up at the mist-shrouded top, then climbed until he could see only the clay wall in front of his face, trapped in an endless rhythm of scooping, kicking, and lifting himself higher. He slipped once and cried out, but dug in fast to stop his slide.

"What?" Emil shouted.

"Nothing," he gasped, resting his face against the cool clay before going on.

Finally, he reached up with his right hand and touched a level area. "I'm on top!" he shouted, and pulled himself over.

He sat there and peered around in the mist. What he could see of the land sloped upstream along the gorge. There seemed to be no obstacles. He sighed with relief and waited.

Lucinda's head popped up through the mist. Max reached down and helped her over. They waited for Emil, then pulled the boy up.

"How do you feel?" Max asked him.

"I'm fine." He was breathing heavily. "Which way?"

"That way," Max said. "Want to rest first?"

"No!" Emil said, staggering to his feet. "Got to go while there's still light."

Max led the way up the slope. The mist thickened, and rain fell gently. Their footing worsened as the slope became steeper. They dug their feet in deeply. Max fell on his face and clawed at the rain-washed clay.

"Sure this is the way?" Emil asked, helping him up.

Max said, "The gorge is at our right, and we're heading upstream." He peered ahead, hoping to see the place where they had come out of the cave.

The sky flashed, and he concentrated on placing his feet as firmly as possible in the slippery mud.

"Go slow!" he shouted back.

The slope seemed to rise endlessly into nowhere, and Max felt a sudden hopelessness; nothing at home had ever been this hard and uncertain, or this stupid, not even returning to Earth.

The roar of water in the gorge below grew louder as the rain increased. The sky flashed, and thunder rumbled. Max stopped to catch his breath.

"What's wrong?" Lucinda shouted as she crawled up next to him.

He shook his head. "Hard to breathe."

They looked back. Emil was lying face down, but he looked up suddenly and kept climbing. Max crept ahead with Lucinda at his side.

The slope leveled off, and the going became easier. They got to their feet as water washed up over the edge from the choked gorge.

Lightning flashed, and Max saw the cave. "There it is!" he shouted, and they hurried toward the opening. Max imagined the gorge overflowing into the cave, running into the column and spilling water across countless light-years. "Inside!" he ordered, suddenly afraid that something else would happen to keep them out.

With Emil and Lucinda right behind him, he hurried into the cave, straining to see ahead. Lightning flashed, revealing a square entrance on the column.

"Keep close!" He went in. The curve's strangeness flowed around him, making his skin tingle.

"We made it!" Emil shouted when the bright exit square became visible.

Max stepped out into yellow brightness. Emil and Lucinda came out and stood next to him, disappointment in their eyes as they glanced around the pale yellow expanse.

"Maybe the light changes," Emil said, "and this is our blue-white station after all."

Lucinda sighed. "At least it's warm. We can dry out."

"We'll know that this is where we started from," Max said, "if we find the habitat."

"But which way?" Emil asked.

"If we walk out in ever wider circles from this column, we'll be sure to find it," Lucinda said. "If it's here."

As they stepped away from the column, they heard a high-pitched whine. They looked back and saw the column whirling. The entrances blurred.

"There it goes again," Emil said, sitting down and covering his ears. "That thing just doesn't want to give us a break. We'll never know where we're stepping through to!" He looked up at Max and shook his head in dismay, seemingly on the verge of tears.

Lucinda sat down next to her brother and put her arm around his shoulders. Max looked up at the storm inside the column. The stuff moved like something alive. The column roared for a moment, then shifted down, and the portals became visible again. The sound had not made him dizzy this time.

"We'll keep trying," Max said as he sat down.

Emil looked at him with irritation. "Max, if they keep spinning the column, we'll never find our way back."

"Calm down," Lucinda said, rubbing her brother's shoulders. Emil closed his eyes.

Max stood up. "I'll check for the habitat."

Lucinda gave him a long look of concern, unlike anything he would have expected from the irritating girl he had known. "Go after you've rested," she said gently.

"It won't take long." He smiled, embarrassed by her attention, then marched away into the brightness, feeling for the first time in his life that he liked her, and wondered if he was fooling himself. He peered into the brightness as he walked, then stopped and looked at his timer. He had been walking for nearly twenty minutes, widening his circle while keeping the column at his right. The column was invisible now, and there was still no sign of the habitat.

He wouldn't have to worry about returning to Earth, or anywhere else, because he might never see the habitat and his parents again. He imagined himself, Emil and Lucinda lying against a column somewhere in the vast alien transport system, too weak to move from lack of food and water, with no one to help them.

Panic shook him as he tried to think of what to do. He wanted to run into the brightness and find the habitat, but he pulled himself together, realizing that they would just have to keep trying the portals until they found the right one. He turned and sprinted back toward the column. It loomed out of the brightness. Emil and Lucinda got up as he approached, obviously glad to see him, but their expressions became downcast when he shook his head, telling them he had failed.

[|Go to Table of Contents](#) |

9

"We'll try the portals in turn," Max said, "clockwise from this one." Emil was about to object. "Well, what's wrong with that?"

"It's systematic, but it doesn't help our odds," Emil said.

Lucinda sighed. "Splitting up might help our odds, Emil, but we might never find each other again. One of us might find the right way immediately, and not be able to tell the other two, ever."

"I know that," Emil replied.

"Then what's your objection?"

Emil was silent.

"There should be a better way than trying one after another," Max said, putting a hand on Emil's shoulder, "but there isn't."

Emil frowned. "It's not fair."

"Why should it be?" Lucinda demanded.

"I think what he means," Max said, "is that if this is something we're *meant* to do, like a game, then it should make sense."

Emil glanced at him. "Right. Whatever's doing this isn't making it easy for us."

Max nodded. "We can't help that, and we're too far in to back out now, so let's go." Lucinda moved toward Emil, then glanced at Max and turned away, as if she didn't want him to see her concern for her brother. "This one," Max said.

He faced the black opening, glanced back at them and went in, following the right-hand S-curve. Something complex happened in these passages, cutting short the light-years between star systems. It seemed that he should feel more than he did. A quick walk through a tunnel, a tingling of the skin, and a sense of the dark flowing around him just didn't seem to be enough to mark the vast distances that were being bridged. It had taken human beings decades to go from Earth to the nearest star and back, yet he was moving to far more distant points in minutes.

How could any human being ever hope to understand such an advanced technology? Was that why he and his companions had been lured into the system, to get lost and have to find their way back? Was it

part of the game to make them wonder if they had been lured out or had gone out of curiosity? The fact that aliens actually existed startled him. To imagine them was one thing, but to face them was something else. Suddenly he wanted to meet an alien, to confront the beings who had taken him and his companions from their home.

"What's wrong?" Emil asked in a shaking voice. "Why'd you stop?"

"I was thinking." Max moved forward again. The exit appeared as a faint outline up ahead. He came to it and stepped out into what seemed to be another rocky tunnel.

"Well, this isn't it," Lucinda said at his right.

"Let's see what's out here," Max said, moving ahead.

Pale daylight filtered into the tunnel. Max and Lucinda came to the mouth and looked out. At their left, a rising yellow sun burned through mists over a dark blue ocean. The horizon startled Max; he was not used to seeing horizons. The ocean was calm, its gentle waves rolling in lazily.

Lucinda grabbed his arm before he could step out. "We almost got killed last time," she said, holding on, but the wonder of the landscape drew him.

"Seems safe enough. Aren't you curious? Emil?"

"Sure."

"Maybe we should go back and try the next portal," Lucinda said, still holding his arm. "Emil is hurt."

"I'm all right," Emil answered behind them. "Let's take a look."

She was silent, but let go of Max's arm. "You can wait here," he said.

"I'll come," she replied.

Max stepped out on the rock-strewn ground and led the way to the gray sands of the beach, under an open sky again far away from the habitat's protected space. Here, as in the flooding gorge, the sky went up forever, and could contain anything. The thin cover of atmosphere was not made to protect him. Planetary atmospheres shielded living things that had adapted to their conditions. Max wondered what levels of solar radiation were getting through and if the air was really fit to breathe.

"It's like some of the images of Earth," he said, finding it hard to believe that there could be any danger here.

"Even Earth would be better than being lost," Lucinda muttered. "I know we were supposed to be looking forward to going back, but I wasn't."

Surprised, Max stopped and looked at her. "But you seemed so sure of yourself," he said. "About everything," he added.

She stared down at her feet "I have to be that way. My mother—well, everyone knows how competent our Navigator is. No child of Linda ten Eyck could ever be less. It helped me to act the way people expected me to. I didn't really have to compete. But what'll I be on Earth? There are millions of kids there—we'll just get lost in the crowd."

He had not expected this from her. He wanted to say something that would reassure her, then wondered what it would take to reassure him. At last he said, "We'll be the ones who found this alien transport

system. That ought to count for something."

She smiled, then looked anxiously after Emil, who had wandered down to the water. "If we get home, she said, taking Max's hand. As they walked toward Emil, the younger boy turned around and frowned, looking puzzled by their handholding.

The waves seemed to whisper more loudly as the yellow sun rose higher, warming their faces, and Max wondered again if they were getting too much radiation. The damp, salty air smelled of vegetation and rotting fish.

"Look!" Lucinda shouted.

To the left of the yellow sun, a bright point was rising. Max realized that it was a second sun, a blue dwarf climbing the sky after its companion. "Another double star!" he said in wonder.

"Double stars are common," Emil said. "There may even be a third star here."

"I'd like to see that," Max said excitedly.

Emil was watching his sister carefully, as if expecting an explanation for her friendlier treatment of Max.

"I wonder what life there is in this ocean," she said.

Max sat down on the sand and hugged his knees. Emil and Lucinda sat down next to him.

The ocean made him feel peaceful, and he imagined schools of exotic fish rushing through the deeps, whales navigating like great ships through vast underwater canyons, giant crabs walking across submerged plains. He glanced at Lucinda questioningly.

"Did you really think," she said, "that you were the only one who was worried about returning to Earth?"

"I guess I did." He felt embarrassed.

"Maybe if you'd talked to more of the others, you'd have known you weren't alone."

"Emil, do you feel the same?" Max asked.

The boy shrugged and looked away. "I guess it'll be interesting." He raised a bushy eyebrow. "If we get back."

Lucinda said, "You told me you were afraid."

Emil glared at her. "You don't have to say it in front of him."

"I was afraid, too," Max said. "Maybe I still am."

Emil looked at him dubiously. "You're just trying to make me feel better. You're friends with her now, so you have to be nice to me. If we weren't in this mess together, you wouldn't think you had to get along."

"But I want to be your friend anyway, if you'll let me."

"I don't get it. You never really liked either of us."

Max took a deep breath. "So I was wrong about you both," he said, surprised at how easy it was to say that now.

"Look at that!" Lucinda shouted.

Something long slid out of the waves onto the beach, moving like a giant black snake, except that it was segmented into joints. It stood up for half its length and swayed back and forth as if searching for something.

Emil stood up, trembling.

"It's seen us," Lucinda said.

"Come on!" Max cried, pulling Lucinda to her feet.

The snake lowered itself and slithered across the sand as they backed away toward the rocky area above the beach, then rose up again and examined them with eyes that were clusters of lenses on each side of its head.

"Why should it want us?" Lucinda asked, gasping for breath as they turned and scrambled across sharp rocks and slippery seaweed.

"Food!" Emil blurted. "Maybe we're the same size as things it lives on."

Max glanced back. The snake threw up sand and weeds as it slid between the rocks. They reached the outcropping, and Max saw for the first time that there were two openings.

"Which one?" Emil cried, tripped, and hit his head on a rock.

"Left, the larger one!" Max shouted. Lucinda helped him with Emil. "Inside!" They dragged him between them.

"I'm okay," Emil said, pulling free.

They ran through the cave tunnel. Max imagined being swallowed by the long black body and digested for weeks; he had once read that snakes did it that way. He was sweating as they sprinted the last few meters and rushed through the black passage. It seemed to take forever to come out. Max felt that he was swimming in a black, oily substance. It slowed him down, but finally he burst out into the yellow station.

"It'll come after us," Emil said, squinting in the bright light. Max noticed the bruise on his forehead. Lucinda took a closer look.

"Does it hurt?" she asked, panting.

"Not much." Emil winced, gulping air.

"Doesn't look bad."

"Leave me alone!" he cried.

She turned to Max. "Maybe it went into the other cave, and wasn't after us at all."

Max shook his head. "It was after us," he said as his breath came easier. "Let's go. If it comes out here, it won't know which one we took."

He faced the next square and went in, with Emil and Lucinda right behind him.

10

Max came to the exit, peered out into a blue-white station, then stepped out on the hard floor. Emil and Lucinda came out and stood at his right.

"The color's right," Emil said.

They stood to one side of the dark exit, ready to flee, but there was no sign that anything was coming through after them.

"Maybe this is our station," Emil said hopefully. "Unless they're using the same color twice."

Lucinda laughed. "No reason they shouldn't."

"Okay," Max said impatiently, "I'll go out in a widening circle. If I don't spot the habitat in ten minutes, I'll come right back. It can't be far if this is our station."

"You're assuming," Emil said, "that there's only one column in the station from which we started. There may be others, far away from our habitat, even if this is the right station. And wouldn't it be better for all of us to go out?"

"I won't be gone long," Max answered. "The habitat is too big to miss."

"Don't be so bossy," Lucinda said.

Max flushed, stung. "I wasn't trying to be," he replied.

As he marched away through the blue-white glare, he thought about how Lucinda used words to mangle people, and how much Emil enjoyed watching her do it. He looked back and saw her waving at him. The glare distorted her figure, making her look taller, exaggerating her shorts and dark hiking shoes. He waved back, then noticed that the column behind her and Emil was nearly invisible now, just about the way it would look if he were near the habitat.

He turned around and searched for it, then went on to his left, still hoping, but saw only bare floor. Disappointed, he started back.

Emil looked downcast.

"It could be over to the right," Lucinda said.

"I'll go again," Max said.

They sat down against the column as he hurried away, resenting the forces, blind or deliberate, that had put them in this situation. They might have died in the flooding gorge, or been eaten by the alien snake. What was the point? He was beginning to suspect that they had been lured out at random into an automatic trap of some kind, one with a purpose set so long ago that it wasn't working right any more.

He stopped, peered ahead, saw only the endless floor, turned and went back.

Lucinda was alone at the column. "Where's Emil?" he asked.

"Searching, because he wasn't sure you'd made a wide enough circle. Tell me, doesn't the color of this

station seem just a bit lighter?"

Max sat down next to her. "You're right. It's the wrong station." He closed his eyes, feeling tired.

"Max..." she started to say.

He opened his eyes. She was gazing at him as if he had become someone else.

"How long have we been gone?" he asked. "I don't remember when we started."

"Nearly fifteen hours by my timer."

"They'll be looking for us by now."

"They'll find the column and go through," she said anxiously.

"Maybe not. They'll search the habitat first, then go outside. That may take a day."

"But if other people have been lured out, they'll go looking immediately. It would be terrible if people got hurt trying to find us. We've got to get back as soon as possible!" She fell silent. Max closed his eyes and drifted.

"Max?"

"What?" he mumbled.

"Do you like me?"

He opened his eyes. "Sure," he heard himself say as he noticed a bruise just below her right knee.

"There's no reason you should," she continued. "I mean, the way I've acted toward you. Sometimes I can't stop myself even when I know I'm being a real bitch. But I was always a little afraid of you."

"Of me?" he asked in surprise.

She nodded. "You're Max Sorby, too high and mighty to have anything to do with the rest of us. You always seemed so happy off by yourself, as if we couldn't possibly be of any interest to you. You acted as if we were all silly. I guess I liked chipping away at you sometimes."

Max shook his head in disbelief. "I don't mind being by myself, and maybe...well, I talked to my parents a lot, and the rest of the time I didn't really feel I needed anyone. It never occurred to me that anyone would resent me for that." He looked directly at her. "There's got to be more than that."

She looked away as if he'd uncovered her deepest secret. "I always thought you were very smart, but you didn't seem to want to do much with it. It made me mad. You wouldn't get very far being by yourself all the time. Maybe if you'd had a brother or sister, you'd have had to get along with them, and that would have made you friendlier." She paused. "Not that it exactly worked that way for me, having a brother."

"I really *like* being by myself."

She sighed. "You're a little shy, Max."

"No, I'm not."

She leaned over and kissed him on the cheek. He stared at her, then turned away.

"See? But it doesn't matter here," she whispered, slipping her hand into his.

"You worry about Emil a lot, don't you?" he asked.

"I do," she said, looking at him grimly. "My mother lost her brother when she wasn't much older than I am, so she makes me look out for Emil. I think she'd go crazy if anything ever happened to him."

"I know," Max replied. "My father told me about the quakes on Mercury. My mother told me he tried to save your uncle. Dad doesn't talk about his bad times much."

"My mother's never forgotten. She's made me feel that if I don't look after Emil, the same thing might happen to him."

"What does your father think?"

"I overheard them arguing once. He told her to go easy on me, to let the dead rest. He was very angry." Lucinda's eyes glistened. "Oh, Max, she must be worried sick about us by now!" Her hand tightened in his.

Feeling a wave of concern and tenderness for her, he leaned over and kissed her cheek. A rush of warmth went through him as her green eyes looked at him. Her face, soft and flushed suddenly, did not belong to the Lucinda he had known or imagined. She leaned closer to him.

"I see you!" Emil called out as he approached. He came to the column and stood over them, grinning. "There's steam coming from your ears, Max."

"Oh, shut up," Lucinda said, glaring at him.

"You found it!" Max shouted, getting to his feet.

Emil's smile faded. He grimaced and gave Max a sad look. "Nah, we're in the wrong place again."

"We have to keep going," Max said as he and Lucinda got up.

"What if that snake is waiting for us somewhere?" Emil asked with a laugh. Max saw that the younger boy was trying hard not to sound afraid.

Lucinda gave him a stern look. "We have no choice. Odds are it didn't follow the way we came. Maybe it never entered the column at all."

"You hope," Emil replied. "It may be waiting for us anywhere. Maybe it's even gone home ahead of us."

"Don't be silly," Lucinda said, looking to Max for help.

Max tried to sound cheerful. "He's only joking."

Emil looked at him warily. "But we can't be sure!"

Max laughed. "That snake wasn't too bright. Probably went back into the ocean."

Emil nodded hopefully, and took a deep breath. "I'm getting hungry."

"We'll only get hungrier," Max said. "Let's go."

"Max," Lucinda said, "do you think we'll have to retrace our steps exactly to get back?"

"What do you mean?"

"Do we have to go back to the ocean world, to the gorge world, then back to that big dome, and then pass through back to where the habitat is trapped?"

Max frowned. "Maybe there's a direct portal back. We can't tell. All we can do is to keep trying them one by one."

Emil looked unhappy. "Which one now?"

"Over here, to the right of the one we were sitting by."

"Don't worry," Lucinda added, "we'll get back."

Emil stepped aside. Max went into the blackness and followed the S-curve to his right. Suddenly he imagined that he had entered the snake's mouth and was marching into the creature's stomach.

"There's the exit!" Lucinda shouted.

Max came to it and peered out. "I think we're back in the yellow station."

He stepped out. Emil and Lucinda came and stood on either side of him. "No snake," he said, pointing to the next portal. "Let's keep going."

He went in. Lucinda came up beside him in the alien darkness and took his hand. They moved forward together.

"I don't see the exit," she said. "This passage seems longer than the others."

"Let's go back!" Emil shouted.

"We've got to be sure," Max insisted. Lucinda's hand tightened in his. His throat felt dry. Finally, he began to see light. The square exit became visible. They came to it and peered out.

The sky was full of stars. A warm breeze blew across the cave exit, creating a low howl. Max saw a forest of bulbous trunks and giant leaves. Two moons seemed to be floating through the twisting branches. One orb was bright yellow, the other bronze.

"This isn't it," Emil said. "Let's go back."

"We need water," Max replied. "Maybe there's some around, and there's no telling when we'll have another chance."

"I am thirsty," Emil said.

"It may be nearby," Max said, stepping cautiously out on the moss-covered ground. The air was warm on his face. He looked up at the starry sky and wondered how far from home they had come this time. How were distances measured through the curving passages? Once again he was awed by the power of the civilization that had made these star-spanning stations.

As his eyes adjusted to the night, he saw away through the forest. "That way. Maybe there's a lake or a stream." He looked back at the outcropping of rocks from which they had emerged. The cave entrance was partly hidden behind bushes.

Lucinda touched his arm. "Listen!"

Max heard something like a cricket chirping, then a low humming. He took her hand and led the way through the trees. Glancing back, he saw that she was holding onto Emil.

"I heard water running," she said suddenly.

They hurried ahead. A stream cut across their path.

"It may not be safe," Lucinda said.

Max got down on his hands and knees, stuck one finger in the water and sniffed the drop. "It smells strange," he said, getting up. "Better not risk it. We have to get back before we get really hungry and thirsty." The flowing water tempted him. He saw the look of disappointment on the pale, moonlit faces of Emil and Lucinda.

Something grunted far behind them.

Emil looked around. "What was that?"

"It's coming closer," Lucinda whispered.

They hid behind one of the bulbous trunks and waited. Max heard another grunt, louder this time. He watched the trail.

A dark shape appeared, at least two meters tall at the shoulder, moving on what seemed to be four legs. Max watched, fascinated. Emil gasped behind him.

The bearlike shape stopped and snorted, as if suddenly aware of them, then reared up on its hind legs, three meters into the tree, and began to munch on the big leaves. Max stood perfectly still and stared at the creature's belly.

Finally, the giant burped, dropped down on all fours again, and ambled into the stream to drink. After a few moments the slurping sounds stopped. The creature wandered up the far bank and disappeared into the shadows.

"Now!" Max said, leading the way back to the trail.

As they approached the outcropping, Max saw dark figures sitting on the rocks around the tunnel entrance. One of the shapes launched itself into the air and landed in front of him.

Emil cried out. "Stand still!" Max whispered loudly.

This creature was something like an ape, but very stocky. It moved toward him, and Max froze as it looked into his eyes. Two other shapes dropped down in front of Emil and Lucinda.

"Don't move," Max said.

Emil stifled a cry.

The creature's face was now close enough for Max to touch. The large eyes seemed puzzled as they examined him. Max's knees shook. The creature turned its head sideways, as if that might help it to understand the intruders, then grunted and touched Max's nose.

He jumped back and waved his arms. "Run! Inside—quick!"

Emil and Lucinda rushed past their creatures. Distracted, Max's biped turned and looked after them.

Seeing his chance, Max dashed for the tunnel, and made it inside just behind Emil and Lucinda.

They ran for the portal, not daring to look back. Max plunged in, with Emil and Lucinda behind him, and the strangeness of the S-curve seemed almost comforting.

"Will they follow?" Emil asked, gasping for breath as they reached the exit.

Max stepped out into a blue station. Emil and Lucinda almost knocked him over as they came out. After a few moments, he realized there was no one behind them.

"I think," Max said as he took a deep breath, "that they must have learned a long time ago to stay away, after a few of them probably disappeared."

"What were they?" Emil asked. "Animals or intelligent beings?"

"Maybe something in between," Max said, still seeing the strange eyes peering at him in the starry night.

"This might be our blue station," Emil said.

"Or the other one we visited," Lucinda added.

"Or a third one," Max said, realizing that the column might have whirled while they were outside.

[Go to Table of Contents](#) |

11

"It's not here," Max said as he sat down between Emil and Lucinda. Again they had explored in widening circles. "I went twice as far." He leaned back against the column and closed his eyes. The way to the habitat's blue station was through one of the twelve portals, he told himself again; but how long would it take to hit on the right one if the columns continued to make their random spins? His answer was always the same: keep trying one portal after another. Spin or no spin, there wasn't much else they could do. Maybe the spins had nothing to do with fixing destinations, and the portals always stopped where they started, as part of a recharging process of some kind. But if destinations were being set, then maybe someone or something wanted them to follow a certain path.

"Let's get going," Lucinda said.

He opened his eyes and saw her standing over him. She helped him up, then looked at her brother.

"Come on, we'll only get more tired and hungry."

Emil struggled to his feet.

Max hurried into the next portal. The blackness closed in around him. His neck tingled, as if he could feel the vastness of the space he was traversing, even though he knew that the passage could not be covering distance in the usual way. It was a shortcut, a way of collapsing the distance between two distant points, as one might bring together the ends of a piece of string. To make space plastic in this way required vast amounts of energy, he supposed as he peered ahead, looking for the exit.

"What's wrong?" Lucinda asked as he stopped.

"This one seems longer than the others," he replied.

He went ahead slowly, and finally saw the exit. It glowed pale green. He approached warily.

"This doesn't look right either," Emil said as they peered out into another cave exit. "Better go back."

Max looked at Lucinda. Her eyes were darker in the green light. She touched his hand. "Maybe we should go back."

Max nodded and turned around. They followed him in silence.

Halfway through the curve, he bumped his nose against a barrier.

"What is it?" Lucinda asked.

"Hit something," he said. "One side of the passage, I think."

"But we're in the middle," Lucinda objected.

Emil said, "Can't walk straight?"

"I was walking straight," Max replied as he reached out and touched the obstruction. He ran his hands across a smooth surface, following it down to his feet, and explored to his left and right, but found no seams. The barrier curved back, becoming the sides of the passage itself.

"I don't know what it is," he said, "but we can't go this way."

"What?" Emil shouted.

"Touch it yourself," Max said. He heard Lucinda tap the surface with her fingers. Emil gave it a few impatient slaps.

"There's no way through," Lucinda said at last.

"But there was," Emil added. "What is this? Why is it here?"

"Maybe we triggered something that closed it," Max said. "Or something decided to close it on us." His throat felt very dry.

"But why?" Emil asked.

"They don't want us to go back this way," Lucinda said.

Max said, "Maybe this passage closes when the column is spinning, and opens when it stops."

"I'm very thirsty, Lucinda, Emil complained.

Max sat down against the barrier. "We'll be right here when it opens." Lucinda slid down next to him.

"I'm going to look out the exit," Emil said impatiently.

"Stay inside!" Lucinda called after him.

Max leaned back and closed his eyes, feeling lost and useless.

Lucinda leaned against him. "Max, what are we going to do?"

He took a deep breath. "I don't know. This is getting complicated. Each portal may have an exit in another column somewhere. That would make twelve columns with twelve portals each. Every one of those one hundred forty-four portals might then lead to a column with twelve more portals, and so on.

The system might branch like a tree. It's possible that only one portal leads back to the column where we started, in the first blue-white station, where the habitat is trapped. The passages work in two directions, but they can close, like this one."

"We may never get back."

"We don't know that. If we have to depend on chance alone, it'll take a long time. If we're meant to get back, then maybe we're being guided toward the right choices. We just don't know...."

Emil's shape was outlined against the square exit.

"Maybe we should go out," Lucinda said, "and risk drinking what water we can find."

"The passage may open while we're gone."

They watched Emil's silhouette in the opening. "We may have to go out and live on that world out there," Lucinda said.

"The passage will open, and we'll get home," Max replied uneasily.

"What if it opens once in a hundred years, or twenty, or five? Even one week would be bad enough."

He put his arm around her. "Don't sound like Emil. It can't be that long."

"Are you getting cold?" she asked suddenly. He felt her shiver against him.

"A little," he said.

"We haven't eaten for a while. That makes you feel colder."

"No kidding. You sound so official."

"Like my mother, you mean."

"A little." He held her closer. "Warmer?"

"Yes," she whispered.

Emil's shape sat down in the exit.

"Lucinda," Max began, feeling awkward.

"What?"

"Let's—let's not ever be the way we've been before, toward each other, I mean."

She touched his face gently. "I promise, Max."

Emil came back and sat down next to them. "Getting dark out there. I saw a few trees beyond the cave." He seemed in a better mood. "Well, what do we do?"

"Get some rest until the passage opens." Max closed his eyes.

"Fine with me," Emil said tiredly.

Max opened his eyes in near darkness. The barrier still pressed against his back. His throat was very dry

now. Lucinda's head lay in his lap.

He touched her gently. She stirred and sat up.

"The barrier's still up," he said. "We'll have to go out and try to find some water."

He heard her stand up and stretch.

"What is it?" Emil asked sleepily.

"We're going outside." He led the way toward the faint exit. The light became brighter when he stepped through the exit into the cave tunnel. He came to the mouth and looked out.

"It seems to be morning," Lucinda said as she came up next to him.

Max stepped out on the rocky ground and breathed warm, humid air. He looked up through the trees and saw a patch of blue sky. It was getting lighter, but he couldn't see the sun.

The exit here was also in an outcropping of rock, set high above the forest floor. The tree trunks were straight and tall. Yellow-green leaves shook on the complex branchings. The forest was strangely quiet.

Emil and Lucinda came out and stood next to him. He smiled at her; she smiled back uneasily. Max took her hand and they started down to the forest floor, with Emil following.

They reached bottom. Here the forest aisles were carpeted with oddly shaped leaves. A rough red moss crept up along the massive tree trunks. Close up, many of the trees seemed deformed, as if someone had tried to make shoulders, arms, legs, and giant heads, but had failed.

"Which way?" Emil asked meekly.

"I hear something," Lucinda said.

"Running water!" Emil shouted.

Max listened. "I hear it, too."

"That way," Lucinda said, pointing straight ahead, and led the way across the carpet of alien leaves. Emil followed her, and Max brought up the rear, stepping carefully on the soft ground as he scanned left and right, trying to be ready for the unexpected. This was a very different forest from the other one they had visited.

Sunlight cast yellow-white spears on the leaves ahead of them. "Sun's higher," Emil said, staring in wonder at the variety of colors brought out by the light.

"Don't touch anything," Max replied. "Alien vegetation might be poisonous."

Emil looked left and right with suspicion.

"Don't get too spooked," Max added. "Just be careful."

"The water's louder," Lucinda said.

They marched across the dewy leaves, drawn by the murmur of the flow, and came out into a clearing of tall yellow grass. High over the trees on the other side, a white sun burned through the morning mists. A warm breeze stirred against Max's face. He heard the stream clearly now.

Lucinda pointed. "It must be on the far side."

"I'm dying for a drink," Emil said. He pushed into the grass, then cried out as it caught on his legs and shorts. "Help me!" he called out, twisting his body to get free.

Lucinda started after him.

"Wait!" Max shouted, grabbing her arm.

"Get me out!" Emil wailed.

"Don't move!" Max shouted to him.

Lucinda tried to twist free.

"Stay here," Max said as he let her go and slowly approached Emil. Gentle motion, he noticed, prevented the briarlike hooks on the grass stalks from catching on his coveralls. He grasped one stalk between the briars; and pulled carefully.

"It hurts!" Emil cried.

Max glanced back at Lucinda. "Stay there. I'm better protected than you are." He was grateful that he had put on his long coveralls over his shirt and shorts. She nodded, her eyes wide with fright, and wrapped her arms around herself as if she were cold.

Emil closed his eyes as Max worked. The hooks came out only with great difficulty. Most were caught on Emil's shorts and were easily removed, but a few had cut deeply into his legs. Max loosened these briars; as carefully as he could, but there was no way to avoid pulling out pieces of flesh and skin. Emil gritted his teeth, then cried out. Max freed the last hook and led Emil out of the grass.

"How do you feel?" he asked, examining the boy's bloodied legs. Fortunately, the briars had missed major blood vessels.

"Funny. A little dizzy."

Lucinda helped Max walk him back into the forest, where they sat him down against a tree. Emil leaned back and closed his eyes. "I'm very thirsty."

"I'll go around the clearing and find the stream," Max said, hurrying away.

Slowly, with great care, he circled the clearing, moving toward the sound of the stream. The sun broke through the trees and was hot on his face. He shielded his eyes with his hands and tried to stay in shade. Unlike the countryside in the habitat, the humidity was set too high, and the alien plant life was varied and dangerous. The forest was alive with unknown things, all belonging to an ancient natural history that he couldn't even imagine. The habitat was less than fifty years old, and had been made for human life. No enemies roamed the inner surface of the asteroid core.

He saw the stream running out of the forest and crossed the far side of the clearing. He came to the water and saw that it ran clear, with multicolored stones on the shallow bottom, catching the sunlight. He knelt down and peered at the liquid. With the passageway closed, they were trapped on this world and would have to risk the water. Later, hunger would force them to chance eating something. He leaned down and sniffed the water. There were no odors. He touched the flow with his tongue, then drank greedily. The liquid rushed down his throat and filled his belly.

He looked around for a way to bring some back, spotted what seemed to be a broken husk lying near a tree, and went over to examine it.

The husk was made of a fibrous material and would hold at least three cups of water. He filled it and started back, moving quickly along the way he had come. Lucinda was kneeling over Emil, stroking his forehead, as Max approached.

She stood up when she saw Max. He gave her the husk, and she knelt down again. Emil opened his eyes, smiled weakly, then closed them again.

"Drink," she pleaded. Max raised Emil's head, and the boy took a couple of swallows.

"Now you," Max said.

She looked at him with concern.

"I drank at the stream," he said.

She sipped, then set the husk down. "I think he's poisoned from the briars." Tears ran down her face. "Max, we've got to do something!" What she feared most had happened, he realized; Emil was hurt and getting worse. "What should we do?" she cried, looking at him as if it was his fault, but he knew that she was blaming herself.

Max stood up. "I'll get some more water." He hurried away, feeling helpless.

[|Go to Table of Contents](#) |

12

The day became warm and humid. Hot breezes hurried through the forest all afternoon, carrying strange odors and small, flowery floaters. Max spotted large bladderthings drifting high up among the swaying branches, occasionally eating one of the flowers. One bladder-creature let out some air and seemed about to descend in pursuit of a floater, but a gust of wind swept them both away. Weak from lack of food, Max sat with Lucinda against a tree, dozing but unable to sleep. Emil lay on a bed of leaves.

"He's dead!" Lucinda cried late in the afternoon. Max roused himself and crawled over to the motionless figure. Lucinda was crying softly as she knelt at her brother's side.

Max leaned over and saw that the boy was breathing. "He's alive."

"Maybe he'll get better," Lucinda whispered, as if fearful of waking him. Max crawled back to the tree and tried to find some sleep.

Emil was still unconscious when Max awoke and saw stars appearing over the clearing as the yellow-white sun went down. He peered at his timer and saw that it had taken ten hours for the sun to set.

Lucinda opened her eyes suddenly, turned toward her brother's motionless body, and cried, "We've got to do something!"

"Maybe he'll be better by morning," Max said, trying to put his arm around her.

"You know he won't," she answered, pushing him away.

Max remembered his father telling him about the senseless death of his friend when a quake had struck the mining town on Mercury. This made no sense, either, Max thought angrily as he looked at Lucinda.

Her eyes were wide as she stared at her brother in the twilight. "I could have kept him from going into that grass," she said.

"It wasn't your fault. He went ahead of us before we could notice the hooked briars, or suspect they might be deadly. Try to get some more rest, or we won't be able to do anything." He felt exhausted as Lucinda put her head on his shoulder.

When he awoke again, long after the alien midnight, a dim red sun had risen over the clearing. A few minutes later it was joined by a pale white sun that stayed low over the trees, casting a sickly glow into the briar-grass. Max realized that they were probably on a planet circling the bright yellow-white sun that had set, in a system that included these two, more distant stars. He moved carefully away from Lucinda, then crawled over and listened to Emil's labored breathing.

"He's worse, isn't he?" she asked.

"Yes," Max admitted as he stood up. "We're rested enough to carry him back now. Maybe the passage has opened."

"Moving him might hurt him even more."

"We have no choice. You take his feet."

They lifted him. He showed no sign of waking. Carrying him sideways, they moved through the forest. Max began to sweat. Emil let out a loud rasp as they began to climb the rocky incline below the outcropping. Max slipped on the wet moss but held his balance, gripping Emil more tightly as he and Lucinda staggered into the opening.

They hurried through the cave and entered the portal. When they neared the point where the barrier had stopped them, they put Emil down, and Max went ahead, feeling for the obstacle.

"It's not here!" he shouted, then bumped into it. "It's still up," he said in despair, then slid down against it and wrapped his arms around his middle to keep from shaking. His stomach knotted as he asked himself what he was going to do. Try to keep from panicking, he supposed. Try not to let his own terrors push him and Lucinda into a panic that would destroy any chances they might have. Maybe this was what people meant when they talked about being brave— going on, staying calm, trying to survive in as reasoned a way as possible even when you were certain it would do no good.

Lucinda's dark shape sat down next to him and said, "He's going to die, and we're never going to leave this place. Why is this stupid thing here? What do they want us to do?"

"I think we got lured into this by an automatic transport system," he said. "I just don't feel that anything alive is running it."

"It's going to kill us," she said tearfully.

"If we'd been lured in for some sort of programmed purpose," Max said, "it wouldn't include letting us die."

"Then the habitat got caught by it in the same way."

"Probably."

"Where?"

Max felt weak. "Near Earth's Sun, maybe."

"But we saw the Sun disappear as we came in."

"Maybe it only looked that way. We were pulled into a station..."

Emil began to wheeze, as if something was caught in his lungs. Max and Lucinda crawled over to him.

"Emil," Max whispered.

The boy was struggling to say something, but Max heard only more wheezing. He touched Emil's forehead. It was hot with fever.

"He's worse," Lucinda said.

They crawled back to the barrier. Its hardness felt cruel against Max's back. He felt angry and resentful. Was there an alien turning it on and off somewhere?

Lucinda rested against him. "All we can do is wait," he said, "until the barrier lets us through. There's nowhere else we can go."

"We can die here or wander around some more," she said, "and end up even more lost." Her body shuddered against him, but she didn't cry. He clenched his teeth and tried to think. It seemed certain that the return to Earth had somehow started this chain of events. Why couldn't the habitat have stayed away? From Centauri it might have gone on to another star, and then another...

He put his arm around Lucinda as she fell asleep. He listened to her breathing for a while, then closed his eyes and surrendered to the dark.

[|Go to Table of Contents |](#)

13

Voices echoed through the dark passageway, as if two or more people were conversing at the entrance.

Impossible, Max told himself as he slipped back into sleep. When he heard the voices again, he felt vaguely that he was not dreaming, but still tried to ignore the sounds. The voices went on talking, and once in a while he could almost make out words. It reminded him of when he would try to hear what his parents were saying in their room. He smiled to himself, feeling superior; dreams had rarely fooled him, and this one wasn't going to either, no matter how hard it tried to convince him it wasn't a dream.

"Max," Lucinda whispered.

"What?" he asked, sitting up.

She sat up next to him, and he was suddenly alert, thinking that Emil was at the exit, talking to himself in a fever.

"Do you hear voices?" Lucinda whispered.

"Yes," Max said, staring toward the opening.

Lights flashed. Emil still lay on the floor, breathing heavily as the lights came toward them. Footsteps

echoed. Aliens were marching into the tunnel, on their way through to a distant world. The barrier would come down, Max realized as he moved toward Emil.

"Pull him over," he whispered. They grabbed Emil by the shoulders, slid him over to the wall, and huddled with him as the lights grew brighter.

"Who are they?" Lucinda whispered.

He felt her shaking next to him, and put his arm around her. Fear jolted through him as he watched the lights. These were the strangers who had built the interstellar passages, the star-people whose fault it was that Emil was dying. Anger surged through him as he stood up, unable to control himself.

"Come on!" he shouted, stepping into the center of the tunnel and facing the lights. "We're over here! Why'd you set up your damn passages so we'd get lost in them? Who do you think you are hijacking our habitat? You don't own the whole universe! We live in it too!" He shook, pushing the words out with his anger. "There's more of us—billions! You my get the three of us, but the rest will hunt you down, even if you are more powerful. We'll find you wherever you are, no matter how long it takes!"

Lucinda was tugging at his arm. "Max, what are you saying?"

The aliens probably couldn't understand him anyway, Max thought, so his defiance was useless. He stood his ground and watched the lights, feeling helpless as they came nearer, but trying to take heart from the fact that there were billions of human beings—a whole solar system full of them—too many for the aliens to stop, he told himself. He was now glad that there were so many.

Beams of light played over his face. He glanced at Lucinda. She was kneeling by Emil, raising his head into her lap.

"Hey—it's a bunch of kids!" a man's voice shouted.

The intruders' beams pointed upward, and Max saw two-legged, two-armed figures standing in front of him. He rushed at the figure directly in front of him, determined to strike a few good blows, but an appendage reached out and grasped his arm, holding him back.

"Who are you?" a man's voice asked.

Max was unable to answer. The aliens were in his mind, using his memories to fool him into seeing and hearing human beings.

"This one's hurt," the man said. "Who are you?" he demanded again.

"Easy," a second male voice said. "They may be in shock."

"I'm Lucinda ten Eyck. This is my brother, Emil LeStrange. Please help him."

"They're Jake and Linda's kids!" the second male voice cried. "Older, of course. But they went back to Earth nearly ten years ago."

"Who's the other boy?"

A light played over Max's face. "He looks familiar. What's your name, son?" The man let go of his arm.

"He's Max Sorby," Lucinda said.

"I knew his folks!" A light shone on the man's face. "Max, it's me, Lucian Russell. Lucky Russell,

remember?"

Max heard the words, but couldn't answer.

"They may be in shock," the other man said.

"How'd you get here, Max?" Lucky asked.

"Where's here?" Lucinda demanded.

"Centauri A-4. How did you get here?"

"It's impossible," the other man said.

"Got to get them out of here," Max heard Lucky say. "This one's out of his head."

Suddenly it all made sense, Max realized with a jolt. The three suns...

"My brother," Lucinda pleaded. "He was caught in some grass with hooks on the stalks. You've got to save him!"

"Oh, my God," Lucky said. "He got into the grass. He'll die if we don't get him up to the habitat fast."

Max tried to shake off his fear and panic. "Lucky," he started to say, realizing that the passages had led them back to Centauri, where they had been found by a team from the new habitat. This man knew him. He was Lucky Russell, the planetary specialist. *I know him—and he isn't an alien*, Max told himself as he passed out.

[|Go to Table of Contents |](#)

14

Max dimly remembered being carried out of the tunnel and through the forest to a waiting shuttle craft. He recalled the pressure of acceleration when the ship took off. Someone had spoken to him, assuring him that he would soon arrive at the Centauri habitat. He woke up in a clean bed, trying to remember what had happened.

A brown-eyed woman was smiling at him. "How do you feel, Max?" she asked.

"Better," he said, thinking that she didn't seem very alien, then remembering that the aliens had turned out to be human.

"You passed out from exhaustion." She looked at him uneasily. "Max, are you up to having a visitor? Lucian Russell wants to talk to you."

"Where are Emil and Lucinda?"

"She's in the next room."

"Is Emil okay?"

"We don't know yet. We're hoping." She touched his cheek as she got up. "My name's Marilyn Soong. I'm your medical doctor. I'll come back when Dr. Russell leaves." She was a small, slender woman with long, black hair; her body swayed gracefully as she went to the door. She paused there and smiled at him. "By the way, it is Max, and not Maxwell?"

"It's Maxwell, but everyone calls me Max."

"Were you named after someone in your family?"

"Dad named me after James Clerk Maxwell, because his roommate in college always kept saying that Maxwell should be as famous as Newton and Einstein. Dumb, huh, to have a first name that's actually a last name."

"I think it's just fine, she said. "And it's not always a last name." She turned and hurried out the door.

When it slid open again, Lucian Russell came in and sat down by the bed. "Hello, Max. I'm glad you're feeling better." He smiled nervously. "Now, I know damn well that it's impossible that you kids were left behind and that you were living there all these years, so can you tell me exactly how you got to be on A-4? Does it have something to do with the barrier we came upon in the passage?"

"Where's Emil?"

Lucian Russell scratched his head, mussing his neatly combed brown hair. His gray eyes gazed steadily at Max. "We made an antitoxin to the poison from the grass, but odds are we're too late. One of our team got scratched a while back, so we know the antitoxin works. I just hope we got to your friend in time, but—"

Max looked into Lucian Russell's face. The man had aged a little; the lines around his eyes were deeper, and his hair was graying at the temples.

"You weren't looking for us," Max said.

"Just lucky, I guess." He smiled, curling his lip. Max frowned, unable to laugh. "We were on A-4 investigating a periodic power surge we've been picking up. Do you know what's going on in that tunnel?"

"Emil's got to recover," Max said.

Lucian Russell gave him a serious look.

"Are you sure he's that sick?" Max asked.

He shrugged. "Let's just hope the doctors are wrong this time."

Max took a deep breath. "I think the power surge in the tunnel comes from the operation of an alien transport system."

Dr. Russell listened intently as Max told the story of how their habitat had been drawn toward the Sun and into the black sphere; how the three of them had been lured out into the station one evening, where they had discovered the terminal columns and passed through several of them, emerging at different points in what seemed to be a vast interstellar network. "We had no idea this was Centauri," Max finished, "not even when we saw the three suns."

"That's understandable, Max. You were struggling to escape danger. This kind of triple system might have been anywhere in the Galaxy."

"You do believe me?"

"You're here. There's no way you three could have been left behind ten years ago, and you wouldn't have survived if you had been. You're not sure where this alien sphere that swallowed your habitat is located?"

"It was waiting for us, but exactly where I don't know. The habitat was making its approach to Saturn's Titan docks when the stars disappeared, then reappeared. We seemed to be jumping in and out of normal space, and each time we got closer to the Sun. Then just as it seemed that we would plunge into the Sun, it became ghostly. We passed into it and were drawn toward a giant black sphere, where the Sun should have been." Max's mind raced with excitement as he began to suspect the larger reasons for what had happened.

Lucian Russell shook his head in amazement. "Supertechnology. It's all around us, from what you've told me, and has been for a long time. They've done so much. Makes us look like children."

"Every place we came out seemed deserted," Max said, sitting up suddenly. "Doctor Russell—"

"Lucky, please. No one's ever suggested more possibilities to me than you have today."

"We've got to get back as soon as possible," Max said. "Nobody knows where we are. They'll discover the passages, and people may get hurt looking for us. I told you how the columns spin, so you can't tell where you came in or where you'll come out. They've probably spun since we got here, so we'll have to start all over again!"

Lucky rubbed his chin. "Maybe not, if the barrier is still blocking our terminal. It does seem deliberate, the way they got you here. Maybe you were meant to get lost and find your way here. Emil's getting hurt was an accident, of course, but I think they might have wanted human beings to become aware of the passage system, to learn how it works, especially to find this link between Earth and Centauri. It means that our colony won't be cut off by decades of slow, relativistic space travel. Living out here won't be the isolation from Earth that we expected. People will be able to go back and forth at will. It changes everything for us."

"But if this was meant to happen, why don't they show themselves? What if they built this system a long time ago, and there's no one left?"

"I hope that's not true."

"Or maybe the way we were lured into the system is just their kind of instruction course, operating on automatic for anyone who comes by."

"Could be, but I hope it's not just a blind program. You've been thinking about what you've seen, haven't you?"

"We've got to get back," Max said softly.

Lucky nodded. "I'll go back with you, if the passage lets us. Don't have any strong personal ties to hold me, even if my friends might miss me." Max dimly recalled that the man had been something of a loner. "But I'm needed for a lot of things here, so I'll have to prepare others to fill in for me."

"We could try to get back on our own," Max said.

Lucky smiled at him. "I'm sure you could. They can do without me here for a week or two, but what if I can't come right back?" He laughed. "Four light- years, and I'll be right back. Never thought I'd say such a thing in my lifetime and mean it. But if the passage closes up, the only way I'd be able to return is by slow starship. I don't want to lose the years of work I've put in to make the habitat work, but I think I should go with you."

"But you will get back," Max said, "if they meant for us to find and use the system."

"We're still only guessing about why you were lured into the system. As you said, it could have been a series of accidents, or an old automatic program."

Max started to get out of bed. Lucky lifted a hand, as if about to restrain him. "It's all right," Max said. "I don't really feel sick any more."

"Lucinda's room is through that door," Lucky said, pointing. "You'll find fresh clothes in the closet. There's a cafeteria down the hall. You and Lucinda get something to eat. I'll go brief some people on what you've told me."

As he left, Max went over to the closet. The fresh clothes were his own, newly cleaned. He dressed quickly, went over to Lucinda's door and was about to knock, but hesitated, trying to sort out his feelings. She was very important to him now. The tenderness he felt for her surprised him.

He knocked twice.

"Come in," she answered.

Max brushed the touchplate with his fingers, and the door slid open. Lucinda sat in a chair, wearing her own shirt, shorts, and hiking shoes, playing nervously with the ends of her long hair.

"I saw Emil," she said, looking up with tears in her eyes. "He's very sick."

Max went to her as she stood up. They embraced, and she held him close. At home, Max realized, he had seen only her pride and intelligence. He would not have guessed that she was also soft and caring. Emil was not unlike her, but more dependent on his sister than he would admit. Both were as vulnerable inside as he was, reaching out to others as well as they could, and hurting when they failed.

"We should eat something," he said finally.

She drew away from him, avoiding his gaze, and he wondered if she would care for him when they got home.

They went out the door, down a long hallway, and stopped at a picture window, where they looked out into the Centauri habitat. Even after ten years, much of it was still unfinished, but the incurving land of the asteroid hollow was mostly green. The sunplate was a bright, clear yellow. Buildings were under construction everywhere. Max saw people working overhead, landscaping, cutting pathways and roads. A stream ran around the equatorial region of the egg-shaped space. There was more than enough room for the small population to grow.

Lucinda took his hand. They watched the new world at work, and Max felt hopeful.

[Go to Table of Contents](#) |

15

After eating, he and Lucinda sat and watched people come and go through the cafeteria. There were nurses and doctors, maintenance people, parents and children. Max looked for people he might know from the time before the colonists moved into this habitat, but it was unlikely that he would recognize anyone after ten years, even when faces seemed familiar. He had been born as his habitat-starship entered the Centauri system, and had been only seven when it left. He had visited this habitat during its construction, but he remembered only a dark, muddy asteroid cavern lit by harsh work lamps, filled with the roar and whine of heavy mining machines and voices shouting over public address systems.

News of their rescue had spread quickly. Many of the people entering the cafeteria nodded in greeting, but kept away. The looks of sympathy and concern on their faces revealed that Emil's condition was common knowledge.

As Lucinda gazed out the window, Max found himself admiring her slightly upturned nose, the way she held her perfect lips together, the pale skin of her neck. Her ears were a bit large, but they were mostly hidden by her abundant hair. She seemed to be ignoring him, and that was like the Lucinda he had watched from afar back home.

"Want to go for a walk?" he asked, feeling out of place.

Her green eyes looked at him sadly. "Emil might wake up." She wanted to be at her brother's side, Max realized, in the hope that he might wake from his coma before he died, and she would have a chance to say good-bye. I wonder what's happening back home," she added, sounding lost.

"Maybe they've found out what's going on," Max said.

Lucinda stood up, looking terrified as she stared past him. Max started to turn around.

"Oh, here you are," Lucky said, sitting down.

Max tensed. Lucinda was trembling, as if she was expecting to hear that Emil was dead.

"There's been no change in Emil," Lucky said, looking up at her.

She sat down.

"Sorry," he said. "Didn't mean to scare you. I shouldn't have come up to you so abruptly."

Lucinda took a sip of water and seemed calmer.

Lucky looked at Max and said, "We have to be in the passage, ready to go through if it opens." He turned to Lucinda. "I know you feel you have to stay with Emil, but he is getting the best possible care. He might be unconscious for a long time."

"But we may never be able to return here," she said.

"Maybe the starfolk want us to get back, to establish this route."

"Then why did they close it off?"

"We can only speculate, but maybe closing it at certain points creates enough of a delay for us to think about what we're doing."

Lucinda looked at Max, and he knew that if she stayed, they might never see each other again. The alien passages might close up forever, and there would be little chance that he could return to Centauri the long way; even if a ship were sent, they'd both be grown up at different ages and changed when they met again.

Max looked at her, unable to speak, and knew that her brother had to come first.

"There's no right answer to this," Lucky said. "You can both go or both stay, or Lucinda can stay with Emil. I can go by myself if Max can draw me a map of what you both remember, but it would be helpful if at least one of you came along. I'll back whatever each of you decides."

"Max and I will go," Lucinda said decisively. "Emil will recover or he won't, whether I'm here or not."

Max looked at her with surprise. She looked back, and he knew how guilty she felt, because he felt the same.

"If Emil dies, and I can't get back," she explained, "then my parents will lose us both, so I should go back even if Max decides to stay." She looked at him directly and said, "There's no reason for Max to stay."

"Staying would be the safer thing to do," Lucky said. "From what you've told me, we won't be going for a stroll."

"We'll get through," Lucinda said. "I'll see Emil before we go."

They sat by Emil's bed together. He was breathing regularly, but his color was a strange pasty gray with patches of brown. Marilyn had told them that all the readings coming from Emil into the diagnostic center showed a stable condition. The look on Lucinda's face told Max that she might still decide to stay. Lucky would have to go alone if she did, he realized.

Lucinda touched her brother's cheek. He stirred and seemed about to open his eyes. She caught her breath, but then he became still again. Lucinda got up and turned away.

"I'm ready," she said, holding back tears. Max felt as if he were stealing her away. She noticed the look on his face and said, "This is the right thing to do. We can't just think of ourselves."

Max was surprised at how grown-up she sounded. They went out and found Lucky waiting in the hall. He led them to the nearby elevator, which took them down to the engineering level. From there a track shuttle whisked them to the axis spaceport at the back of the asteroid, where a snub-nosed shuttle was waiting, its shielding discolored from fiery atmospheric passages.

Lucky led them up the small ramp and forward into the cramped passenger bay, where they strapped in and watched the screen light up to show the three suns of the Centauri system.

"Here we go," the pilot's voice said over the intercom.

Max glanced at Lucinda. She was watching the screen as if he didn't exist, and he realized that even though she was doing what she thought was right, her decision to leave her brother was tearing at her.

Acceleration pressed him back. A rear view of the asteroid flashed on the screen as the shuttle pulled away. The habitat looked like a potato, baking in the heat of the tri-star.

Centauri A-4 was bright in the light of its sun. As the shuttle pulled toward the daylit side, Max saw green and brown continents, a sparkling ocean, clouds and icecaps, and realized that this planet had to be only one of many worlds where the builders of the passageways had left a terminal.

Max recalled that it had been decided a long time ago not to settle any of the planets in the Centauri system, even if habitable ones were found, unless it became a matter of survival; but that would happen only if the habitat in high orbit around this fourth planet failed or was faced with danger. Exploration would continue, but nothing would be done to change the course of A-4's evolution. The species that had shown signs of intelligence would not develop for ages yet, but it would have its chance, not realizing that an older one had decided not to interfere.

The planet filled the screen as the ship turned around on its gyros and fired braking bursts. Deceleration pressed Max into his cushions. He felt shaky and closed his eyes. Lucinda's hand found his as the shuttle fell toward the planet, and after what seemed a long moment of weightlessness, the engines fired and

stayed on. The ship vibrated. Finally, Max felt a gentle rocking motion as the craft settled down on its shocks.

They unstrapped and climbed down the ladder to the exit bay.

"There's enough food and water in these packs for a week," Lucky said, opening the lockers.

"We could have used these," Max said as he put his arms through the straps and positioned the pack on his back.

"What was it like?" Lucky asked. "Did you feel forced or compelled by something outside yourselves?"

"Something seemed to know," Lucinda replied, "that we were curious about what was outside the habitat. We had to leave it—we couldn't stop ourselves."

"It's very important, what happened to you," Lucky said.

"Sure," Max answered bitterly. "Important enough to hurt Emil. They don't care what happens to us."

"The aliens didn't hurt Emil," Lucky said softly. "That was an accident. We've yet to learn what they intend toward us, if anything."

The lock opened. They stepped in and waited for the inner door to close behind them. A breeze whipped in as the outer door opened, and Max tensed as he saw the clearing where Emil had been caught in the briars.

Lucky said, "We've burned a path to the forest, but be careful. This world looks Earthlike, but the biology gets strange and dangerous."

He went down the short ramp. Max and Lucinda followed. Smells from the burnt grass filled the air.

Lucky adjusted his radio pickup to his ear and mouth. "Jim, this is Lucky. Got me?" He waited. "Okay, you're clear." He looked at Max. "The shuttle will wait. If the passage is open, we'll call in another team to wait outside while we go through."

He led the way. Lucinda followed. Max brought up the rear, stepping carefully over the charred ground. The deadly grass stood on both sides of the path, looking innocent under the bright blue sky. Lucinda moved slowly ahead of him.

They entered the forest. Max peered into the green hues between the tall trees and spotted the outcropping.

"I wanted to ask you," Lucky said as they approached it, "why you were so angry when we found you, as if you knew exactly to whom you were speaking."

"I thought you were aliens," Max said. "And for all we knew, you could have been. I felt they were playing with us."

"I understand," Lucky said as they came to the foot of the rocky incline.

He led the way up, with Max bringing up the rear. At the opening, Lucky turned and said, "There's a flashlight in each of your side pockets."

Lucinda pulled hers from the pocket on her pack and shone it into the dark opening. Max turned on his beam, and together they went into the outer cave.

"I hope it's open," Lucinda said as they neared the square portal.

They stepped in together and approached the point where the barrier had been—and bumped into it.

"Still there, huh?" Lucky said behind them.

Max felt a moment of panic as he realized that he and Lucinda might live out their lives in the Centauri habitat. They would never see their homes and parents again. It would take more than four years for a radio signal just to tell Earth what had happened to them, but how would anyone get a message to the imprisoned habitat? And it would take just as long for a reply—nine years, at least, before he and Lucinda learned what had happened to the habitat, assuming anyone had been able to find out.

"No one at home may ever know what happened to us," Lucinda said softly.

"We'll wait," Lucky said. "Maybe the power surges were a sign of opening and closing, and not just of your coming through. It's possible the system has to recharge."

"I've noticed one thing," Max said. "When the barrier is up, the passage seems dead. There's no sign that it's doing anything, The S-curve and the feeling of blackness pressing in are gone."

"Where would the power come from?" Lucinda asked as she took off her pack and sat down on it.

Lucky set down his light so it would cast its beam upward, then dropped his own pack and sat against it. "It might be channeled from a star somewhere."

"From a star?" Max asked as he put down his pack and sat down against the barrier.

"Enormous amounts of energy would be needed to roll up space-time the way these passages seem to do when they join up distant points. The limits of space-time are not easily overcome, not with the safety this system shows."

"You've been thinking about this," Max said.

"I may be wrong about the source being a sun, but this system does eat huge amounts of power, at levels we can't even measure properly. Maybe only a sun can provide the power needed, and the surges are transient. They don't originate from a source that we can pinpoint, so I conclude that the power flows in from elsewhere, through some form of shortcut link, pumping power out of a sun, or some other suitably large source. I hope we'll be able to go through."

"The best we can hope for is to connect directly with the habitat," Max said, "wherever that is, but we'll probably come out in a long series of other places. I hope something wants us to get back."

"There's an advanced civilization behind all this," Lucky continued, "and we're sitting in one of its artifacts. When we received the message from Earth telling us that they were picking up alien tachyon communications, I thought that was all we'd ever find out, that the signals would remain indecipherable, and there would be no alien Rosetta Stone to help us read the language, but the message turned out to be in pictures, a diagram warning us about the infall of cometary objects from the outer Solar System, and nothing else. The message proved the existence of alien senders, and this may be their interstellar transport system."

"We can't be sure that there is an alien civilization," Lucinda replied. "This system may be all that's left of them, running on automatic, trapping people. Maybe even the signals Earth has received are automatic transmissions, sent out by machines."

"I hope you're wrong," Lucky said. "It would be sad to find that the most important discovery in all human history is a relic, and that you were lured out by a blind program."

Lucinda said, "Maybe we triggered something—a kind of mental manual for teaching people how to use the system, their way of making contact with younger races. They wait until the civilization is advanced enough, then take a sample of its people and put them through a maze."

"Some manual," Lucky said.

"I wonder if this alien civilization could be dangerous to us," Max said.

"I don't want to believe that either," Lucky replied. "With all this accomplishment, I don't see that there'd be anything they'd want from us, except to find out how we thought about things, how we regard the universe. They wouldn't want to roast and eat us." He laughed.

Max grimaced, even though he knew that the man was only trying to break the tension. "There are a lot of things no one wants to believe—but they may still turn out to be so." He could not believe that Emil would die, but it still might happen.

"I've got to go outside," Lucky said as he stood up. "Can't get a radio signal in here on my headset. We have to know if the shuttle is picking up anything from this place. Don't go away." He laughed again.

Max watched his light recede and disappear through the square exit.

"Sometimes he irritates me," Max said when they were alone.

"It's just his relaxed style, Max. Don't be fooled, he seems smart. My father's like that."

"Do you think he's telling us everything he suspects?" Max asked.

"I don't know. He's thinking very hard about all this, and he is worried about us."

"Maybe you're right," Max said. "Dad once told me how your father joked around when they were young. Dad never liked wise guys. I guess I got it from him."

"Sober Sorby—that's what my father called yours." She tried to laugh, but her voice broke. She clasped his hand, and her fears were his own. Emil would die, and they would never find their way home.

[Go to Table of Contents](#) |

16

"Look!" Lucinda cried and let go of his hand.

He pushed away from the barrier and turned around. It was glowing a deep yellow. He scrambled to his feet and put on his pack.

"Lucky!" Lucinda shouted as she got up and slipped on her pack. "Hurry!"

Max watched the pulsing barrier. "Get ready! It may be now or never." Vague forms moved behind it. They seemed to have two hands and two feet. He came up close and tried to see through. A face seemed to peer back at him, but he wondered if it was his own, distorted by the glow. Then a large eye blinked at him, and he knew that it was not his own. He wanted the barrier to come down, but feared that now the aliens were waiting to bar the way home. A second face appeared next to the one in front of

him. The masklike expressions seemed to be set in a look of curiosity. He put up his right hand to the barrier, and a hand raised itself to meet his, as if in a mirror. Abruptly, the figures retreated beyond visibility.

"Lucky!" Lucinda called from far behind him. "Max, he can't hear me. I'll get him."

"No! We may get separated. Are you ready?" He pointed his light.

"Yes," she said, coming up beside him. "Lucky, come back now!"

The barrier flickered, as if there was a fire on the other side.

Max took a deep breath. "Lucky!"

"Lucky!" Lucinda called again, but got no answer. "He must have gone back to the shuttle for something."

The barrier glowed brightly. Max turned off his light and closed his eyes against the sudden glare. There was no heat. He opened them to darkness.

"Is it down?" Lucinda asked.

He grabbed her hand and they went ahead slowly. Again, the strange darkness flowed around them as they followed the S-curve, and he saw the glow of the exit. They hurried to it and stepped out into the brightness of a blue station. Max looked up at the massive column rising above them, its inner storms still churning. There was no sign of aliens anywhere.

"Lucky will follow us," Max said, "as long as the way stays open." They sat down with their packs against the column and waited. "I think I saw them," he said. "Did you?"

"No, it was too bright."

"You were too far back," he said. "There were alien figures behind the barrier."

Lucinda rummaged around in one of the side pockets of her pack. "We should mark these passages. If the next one takes us home, Lucky will know how to follow us from Centauri. We'll leave messages for those who might be looking for us. Here's a marker."

Max said, "What's keeping Lucky?"

They got up and went inside, hurrying through the darkness. "It's glowing!" Lucinda exclaimed as they passed the turn and came up against the barrier. Alien figures were again moving on the other side.

The glow diminished and died. Lucinda flicked on her light. Max touched the wall, feeling its hardness once again. "We're cut off from Centauri," he said, turning his light away.

"What do we do now?"

"Try the next entrance." He felt defeated.

"We're on our own again," she said.

He said nothing as she pointed her beam up and looked at him. "Max, what is it?"

"Nothing."

"Get hold of yourself," she said firmly, sounding like the old Lucinda—precise, ready to cut him down if

he gave her an opening, except that now she was on his side. "We could have all marched into that grass. Our job is still to get home. We don't have a choice anyway. We can't wait here until this thing goes down again. Come on."

They went back out into the station. Lucinda wrote a message on the smooth surface of the column:

IF YOU COME OUT ON AN OCEAN WORLD,
BEWARE OF BIG SNAKES—*Max and Lucinda*

She went to the next entrance and wrote:

THIS ONE GOES TO ALPHA CENTAURI FOUR,
BUT IT'S CLOSED SOMETIMES—*M and L*

"It's the best we can do," she said. "Let's hope the messages stay with each portal when it spins." She put the marker in her shirt pocket. "If the next portal takes us home, we'll come back and mark this entrance."

"If we can," he said.

They faced the next portal and stepped in together. Her hand slipped into his as they went forward. Max felt the familiar curve of the passage, and wondered why he could feel the turn. Even with a light in his hand, there was a sense of guiding curvature. Light-years were nothing to these shaped bridges.

He peered ahead and saw a pale glow in the exit. They came to it and looked out on a strange vista of terraces set in the side of a great mountain. Lakes of glass glistened on each terrace.

They stepped out into warm, humid air, under a mountainside terrace. The sky was gray-white and motionless, as if it were a painted ceiling.

Lucinda pointed. "Look there!"

Something had broken through the surface of a lake far below and was moving toward the edge. The thing was large, reminding Max of whales from historical holos. It growled deeply, as if it had become aware of them.

"What is it?" Lucinda asked.

The growl echoed between the mountains. They retreated from the vista, resisting its fascination. The strange thing rose from its lake and floated upward as they backed into the portal.

"That was weird," Lucinda said as they followed the curve back into the blue station.

Max shuddered at the way the alien thing had menaced them from afar, like something in a bad dream, and wondered if they had come upon it by chance, or if it had been a warning. Again he wondered about the possible dangers of contact with aliens.

Lucinda took out her marker and wrote:

TERRACE WORLD
BE CAREFUL OF ALIEN

They entered the next portal.

[|Go to Table of Contents |](#)

"I can't see the way out," Max said, feeling uneasy.

"Might be a long passage," Lucinda answered.

"None has been this long, Max said as they hurried on through the darkness. "I see the exit," he said finally. They came to it and looked out into a blue station.

"The color's right," Lucinda said as they stepped out into the brightness and started across the floor. "Wait," she added, and hurried back to the column to mark the exit:

THIS PASSAGE CONNECTS WITH A BLUE STATION
THE MARKED ENTRANCE THERE CONNECTS WITH
CENTAURI A-4

"I think that's clear enough."

"Those markings had better stay with the columns," Max said.

"We haven't seen the columns spin the last few times. It's as if they wanted us to get lost, and now they want us to get home. Let's wait a few minutes and see if the column spins."

As they waited, Max thought of Emil and wanted to say something to console Lucinda, but nothing seemed right. He knew that she was blaming herself, even though it wasn't her fault. No one could look out for another person forever.

"It's starting to spin," Lucinda said as he looked out across the station. He turned around, and they watched the column blur and whine, and finally stop. They went up to their exit and saw Lucinda's sign. "That's a relief," she murmured. "We can rely on our markings."

Then, as they went out into the station and searched for the mountainous shape of the habitat, Max realized that nothing would be as it had been. The life he had loved was over, even if they got back. He felt closer to Lucinda now, but wondered how she might feel toward him later.

"I hear voices," she said.

Max stopped and listened. "I hear them, too." His pulse quickened. It didn't seem possible that they had found the right station in the vast alien web.

They ran forward. The habitat loomed up before them in the brightness, still frozen in the alien floor. Several figures were out by the forward manual lock.

"Hey!" Lucinda shouted to them.

Max hurried after her, feeling strangely detached, as if this weren't happening.

"Lucinda!" one figure cried out, waving.

Max saw Linda ten Eyck. Jake was with her. They rushed up and embraced their daughter. Both seemed thinner, and Jake had not shaved for some time.

"Where's Emil?" Linda demanded, looking around.

"Max!" his mother's voice cried. Joe and Rosalie rushed up from his left and hugged him wildly. He felt a moment of relief as his mother kissed him, but it died away when he heard Lucinda struggling, on the verge of tears, to tell Linda and Jake the bad news.

"Max, where have you been all week?" Joe demanded.

His mother gave him a suspicious look, then glanced at Lucinda.

"When we couldn't read your wrist IDs inside the habitat," Joe went on, "we started to search out here."

"You just started?" Max asked, noticing two older boys in front of the airlock. One of them was Muhammad Bekhter; the dark-haired boy lifted a hand in greeting.

"We've been coming out here for two days," Joe said. "It seemed impossible that anyone would have come out here, but the alarm sensor insisted that the manual locks were open. I almost fell over when I went to check and saw they were open, and realized that you had come out here."

"We hoped that the three of you were together, hiding somewhere in the hollow," Rosalie added.

"Why would we be hiding?" Lucinda asked softly, turning away from her mother's gaze.

"Have you seen the column!" Max asked nervously.

His father nodded. Lucinda turned to him and asked, "Has anyone else gone through it?"

"No, we've kept people away, and someone's always on guard by the airlock."

"Good," Lucinda said with relief.

"What happened, Max?" Jake demanded, holding Linda's hand. She stood rigidly at his side.

"You couldn't pick up our IDs," Max explained, "because we were light- years away. The portals in the column lead to stations in other star systems. One of them goes to Alpha Centauri A-4."

"Emil's still there, at the colony," Lucinda said.

"He was poisoned by some briars on A-4," Max continued, "but the colony found us. He's in the hospital on the habitat. They gave him antitoxin."

Max saw Linda ten Eyck stiffen, staring at her daughter in disbelief, her hands trembling. She had lost a brother, and now her son was in danger, or already dead.

Jake put his arm around her. "What are his chances?"

"We don't know," Lucinda said in a shaking voice, still avoiding her mother's gaze.

"Can you take us to him?" Linda asked.

"The portal closed up behind us," Max answered. "We don't know when it will open."

"Can you show us?" Jake asked.

Max nodded. "Sure, but—"

"Rosalie and I will come with you," Joe said.

"But what's happened here?" Max asked, looking at his parents, then at the guards by the airlock.

"We're in a station of some kind," his father said, "probably somewhere in a close orbit around the Sun."

"Some people wander out," Jake explained, "so we've posted guards, in case anyone gets the urge to go exploring."

"That's what happened to us," Max said, looking at Lucinda, "but the feeling wore off after we'd gone through the column."

"It seems to affect people by degrees," Linda managed to say, looking dazed as she stepped away from Jake.

Max looked at his father. "Lucky Russell rescued us from A-4. The colony's excited about the possibility of having a direct link with us."

"Sure," Joe said, "if we can figure out where we are."

"But you said we're near the Sun," Lucinda said.

"That's only a guess," Joe replied. "We could be halfway across the known universe, from what you two have told us."

Linda said, "A link with Centauri, or with anywhere else, won't mean much if the habitat remains trapped here."

Max felt uneasy before the two sets of parents. Rosalie was looking at him strangely, as if he had become someone else.

"We'll get extra packs," Jake said, looking at his wife with concern. "Are you kids up to showing us the way right now?"

"Sure," Max said, hoping that the barrier would be down.

"Could you make a sketch of the portal connections?" Linda asked, her voice trembling.

"Yes," Max said, "but there'd be no way to tell distances. We can describe the places, but not where they are. We saw different suns in the sky, so we had to be light-years away. Centauri is the only known place we visited."

Something rumbled in the distance, as if a storm were approaching. They all looked up, but the blue brightness was unchanged.

"We haven't heard that before," Linda said.

There was a flash high over the habitat. It came again, brighter. Suddenly it was flashing every second, brighter each time.

"Everyone, back inside!" the navigator shouted over the rumble.

As they retreated toward the airlock, Joe glanced at Max. "Do you know what this is, son?"

The flashes came faster, and the rumbling deepened. Max stopped and turned around. Lucinda did the same, and as he looked at her he knew what they both expected.

"What is it?" Linda demanded.

"I think the aliens are about to show themselves," Max said.

[Go to Table of Contents](#) |

18

"Look at that!" Muhammad shouted.

Max saw a dark outline in the center of the flashing area.

"A ship!" Lucinda cried.

An alien ship, Max thought, as the black egg-shape descended slowly toward the station floor.

"It's being brought in the way we were," Joe said as the flashing and rumbling stopped.

The vessel touched the floor and settled slightly on its shocks. Max saw markings on the ship's side, but the glare made them illegible.

They waited in silence. Finally, two shapes emerged from the black hull and moved across the bright floor. They were of human height, but in the distorting glare they seemed to lack arms and heads. Max tensed as the black masses drew near, moving as if they were machines.

Jake and Linda stepped forward. The black figures halted, and one came forward. It acquired arms and a clearly human face, then raised one arm in greeting—and Max saw a woman about five and a half feet tall. She seemed slim under her black jumpsuit. Her face was pale, with some freckles, her hair reddish brown. She was an adult, but Max couldn't be sure of her age. Her light green eyes seemed to be searching for someone she knew.

"My name is Lissa Quintana-Green-Wolfe," she said in a slightly raspy voice. "I'm science officer on the ship behind me. We've been worried about you on Earth. I'm glad to see you all safe here."

There was a long silence.

The woman from Earth smiled. "You will find an entry for my parents in your scientific records, under my last name. But to save identification time, let me ask about Joe Sorby. He went to college with my father on Bernal One."

"That's me," Max's father said.

She came up to him and held out her hand. "Joe? I'm your old friend Morey's daughter, Lissa," she said as they shook hands. Joe was smiling, but Max saw that his father was puzzled. "And you must be Rosalie," Lissa said. "I grew up hearing about you two—the big miners' strike on Mercury, the quakes, the building of the habitat there. My father kept up with all of it."

"This is our son, Maxwell," Rosalie said.

"Hello, Maxwell. They call you Max?"

"Sure," Max said.

"Will you please tell us what's going on?" the navigator cut in. "I'm Linda ten Eyck. This is Jake

LeStrange. Our son is very ill"

"What's wrong with him?" Lissa asked with concern.

Lucinda glanced at Max, and he knew that pieces of the mystery were coming together—the habitat's capture by the alien station, their wanderings through the alien web, and the arrival of Lissa's ship were all part of it. Max was sure that Lissa was carrying information that would complete the picture.

"My son is at the Centauri habitat," Linda said.

As she spoke, the figure behind Lissa came forward. Max saw a sandy-haired man with pale blue eyes, slightly taller than Lissa. He seemed stocky in his jumpsuit.

"This is Captain Alek Calder," Lissa said, showing no surprise at what Linda had just told her.

Captain Calder nodded in greeting. "I want you all to know that we've detected no danger in the docking procedure by which your habitat and our ship were drawn into this station."

"And where is this station?" Linda demanded.

"Inside the Sun itself," Lissa replied.

"The Sun?" Jake asked.

"All of this," Lissa continued, "may be described as a suncore station, designed to sit inside a star and draw power from the star. Obviously, the station could not be placed directly inside a sun's fusion furnace without vaporizing, so this station exists in what may be described as *otherspace*, outside our space but congruent with it. This station sits in that space, where there is no sun as we know it, but which shares its location with our Sun's interior. Somewhere in this station is a device whose core blinks back and forth from normal to otherspace, and uses that infinitesimal interval of time to draw power from the Sun's fusion process. At least that's what we think happens, even if the details are very different. In effect, two kinds of space are superimposed on each other, making it possible to harness the energy of a star. To put it in very quaint terms, this station is a kind of waterwheel, turned by the controlled amounts of energy released from the Sun, much in the same way a stream or waterfall would turn a generator wheel or millstone."

"How do you know any of this?" Jake demanded.

"After your habitat disappeared during its approach to Titan," Lissa continued, "we went out to the point in space where you were last seen. We found no evidence along your course that you had disintegrated. I felt that there was *something* at the point in space where you vanished. We passed through the same window you did and arrived here, although for a few moments it seemed as if we were being pulled into the Sun. There may be two windows, one in the outer Solar System near Saturn's orbit, where you entered, and one nearer the Sun. The second one may be there to orient incoming vessels, or just as a spare. When you entered the distant window and came out closer to the Sun, you had in effect stitched through space like a needle through a folded fabric. You probably saw that the Sun was closer. You were being given a clue, terrifying as it was."

"Are you sure of this?" Jake asked.

"I've been working at uncovering something like this all my life," Lissa said. "We've been suspicious of the Sun ever since the discovery of tachyon transmissions from the stars twenty years ago. At that time we learned that our Sun is a tachyon crossroads, a focus of some kind—probably quite routine—for faster-than-light communications. The existence of this station fits in with that early observation. I'm

certain that what you have to tell me will confirm and extend what I've described."

Linda asked, "What can Earth do to free us?"

"Very little, at the moment." Lissa smiled. "I suspect that someone wanted you to stay a while."

"Who are they?" Jake asked.

"We don't know anything about them," Lissa replied, "except that they exist. I suspect my ship is not under restraint, and that they wanted us to find you. I think that if we activate our g-pusher drive, it will trigger this station's departure systems, and we will be ejected through one of the existing windows."

"Are you sure?" Linda asked.

"I'm guessing that this suncore station," Lissa continued, "is part of a communications and travel net, a component of a grid for powering interstellar vessels. It probably contains repair facilities, judging by its size. Stations of this kind may be common throughout our Galaxy."

Max saw his chance. "Better than that," he said. "Over in that direction there is a column with twelve portals. There's a tunnel in each that leads to another star system. Lucinda and I, and Emil, explored a number of them. One passage took us back to Centauri. Emil's there now, in the habitat's hospital."

"He's recovering from an alien poison," Lucinda said in a shaking voice.

"We saw living things on the worlds we visited," Max continued. "I saw what might have been intelligent beings inside one of the passages, when I was looking through a barrier that went up there."

[|Go to Table of Contents](#) |

19

As the habitat's assembly came to order, the navigator introduced the woman from Earth, then sat down in the first row with her daughter, Jake, Max and his parents.

The spherical chamber was silent as Lissa stood up and repeated what she had told the group outside, including what she had learned from Max and Lucinda. "Now I want to tell you what we believe may be true," she continued, "about the civilization, or civilizations, out in the Galaxy. Many of us at the Interstellar Institute believe that the attitude of galactic civilizations toward us may be divided into two factions—nurturers and weeders. We think they've been debating about us, in a general way, for maybe a million years, or from just before humanoid life appeared on Earth. The actions flowing from this debate explain, I believe, why the habitat is here in the suncore station, and what happened to Max Sorby and Lucinda ten Eyck."

And to Emil, Max thought sadly.

"Our previous discovery of their tachyon communications, together with what you've learned here, may give us a clue to what the attitude toward us might be, or is about to become."

Max felt a rush of excitement tainted with fear, as if he was waiting for his grades, or was about to be judged in a school project. What right did an alien species have to make decisions about humankind? They were not humanity's parents or teachers.

"We've thought about this in several ways at the Institute," Lissa continued. "To some of us it seemed that

if life were plentiful in the universe, then even a single technical civilization might overrun our Galaxy in less than thirty million years. That's a very short time in the life of a galaxy. It would mean that younger cultures, when they attained the means to leave their sunspaces, would encounter the galactic culture and stop developing. They would adopt the dominant culture's ideas and technologies, and lose the unique road they might have taken in ignorance of the galactic culture's existence. Some of us have argued that the first culture to sweep the galaxy might have learned this when it found itself surrounded by echoes of itself, in the form of cultures it had influenced earlier. Not wishing to have this happen again, it began to nurture worlds where life might still develop, but it also set up limits to prevent developing civilizations from bursting the bounds of their solar systems too easily and losing their individuality. They could have done this by slowing down evolutionary processes with periodic catastrophes. One example would be an inward rain of asteroids from the cometary shells that surround most solar systems. Ice ages caused by such collisions would slow intelligent life's emergence but not stop it, thus saving the galaxy from being choked with intelligent life. Cultures would emerge spaced across great stretches of time, much in the same way as parents often space their children. Individual cultures would have a chance to shine, to be themselves before meeting others. Their emergence onto the galactic stage of history would be slow, based on careful prior exchanges of technical and ecological information, of the kind that would help species control their more rampant, darker natures. Cultures engaged in purely informational exchange would be stimulated by each other's unique outlooks and experiences of nature without being swamped."

Lissa paused and looked around the gathering. "But some cultures would perish," she continued. "If the weeders exist, then they've seen many tragedies. But imagine how terrible it would be to use up a whole galaxy for resources and have only one culture to show for it. That would be the greater tragedy. Imagine how such a dominant culture might feel when it looked back and understood what it had done. However rich it would be in knowledge and spirit, it would know that an infinity of riches had also been lost, never to be regained."

Max glanced at Lucinda's parents and saw their unease. They knew this was important, but their immediate worry had to be about Emil.

"Everything we know about the growth of science and technology," Lissa continued with great emphasis, "suggests massive exponential growth that leads to explosive cultural transformations and expansion beyond a single planet. Many worlds probably destroy themselves before they can look beyond their solar systems, but it takes only one success to spread through a galaxy. If that happens at the right time, that one civilization would not even have to destroy any existing cultures, only worlds where life might one day develop."

Lissa smiled. "Some of you might quite naturally resent the idea of being judged by alien others, or having them make decisions about our lives. But they wouldn't see it that way at all. No life can think only of itself for long. The weeders and nurturers would have seen countless forms of sunlife coming up, growing into self-awareness and tragedy at the same time. Many would weed themselves, with no one lifting a finger to destroy them. Meanwhile, the nurturers would strive to help civilizations grow up in less cruel ways. Contacting them directly would not be the way to do it, since that would alter the very individuality that is developing—which is all that any civilization really prizes in any other. So, by slowing the emergence of cultures, the nurturers would preserve a galaxy's resources, and by isolating a culture preserve its individuality. Yes, some cultures would die."

Max felt both challenged and awed by her words.

"But who could these weeders and nurturers be?" Jake asked.

"They are probably a very old culture," Lissa replied. "Having achieved everything that younger species strive for, this is probably the only interesting thing left for them to do. Of course, we can't be certain yet

that all this is true, or that the weeders and nurturers even exist." She was silent for a few moments, then began to pace back and forth before the assembly. She was graceful, Max noticed, her steps sure. She was, he realized, the most intriguing person he had ever met.

"But consider," she continued, facing the gathering, "what it means for you to be here inside the Sun. There are many ways to put together the clues and evidence we've gathered, but we must also include the possibility that clues have been *given* to us, and that we were meant to be having this very kind of discussion, in which we try to think about how galactic cultures might regard us. It may be that our Galaxy has always been safe from being overrun, because most cultures perish through nuclear wars and technological disasters, rather than from outright weeding. Perhaps ours is a young galaxy, in which the weeder-nurturers seek to prevent what has happened in older ones. As you know, in the years when your habitat was returning from Centauri, we received what seemed to be a radio warning from the Cometary Halo, or the Oort Cloud, as it is better known. I was part of the expedition that found the transmitter, which might have been placed there by the nurturers, or by another civilization seeking to warn us about the dangers of cometary infall. Later that same year we detected a whole network of tachyon communications crossing the galaxy, with some of them passing through our sun. That was what first made me suspicious. The existence of this station makes sense of that observation. I think we'll find that stars are used to channel and amplify tachyon links, and that they also power physical bridges." She gazed out at the gathering. "They're talking to each other out there!" she said, gesturing with both arms.

A chill went through Max as he wondered what terrible things the aliens might be saying about humanity, especially if the aliens were like the whale-thing that had menaced Lucinda and him on the terrace world.

"It was fortunate that we were contacted by radio," Lissa continued, "since it's a means we knew before our discovery of tachyons. Someone wanted to make sure that we would receive and understand the warning about cometary bombardment, and perhaps wanted to do so anonymously, using a backward technology. The signals were a display diagram, showing us where the transmitter was located. You can't get simpler than that. They thought we were worth warning, too far along to let perish, as they might have let happen with Earth's dinosaurs. Or perhaps the transmitter was just a routine buoy, of the kind used to mark ocean reefs to warn ships. But one thing is inescapable—any kind of message received by one culture from another has a shaping effect on the recipient culture, even if *nothing* in the message is understood, even if it's only a nonsense message proving that the other culture exists, or once existed. The sending culture had to know that we would never look outward in the same way again."

"But is there any danger from cometary infall?" Linda ten Eyck asked.

"Not that we could find," Lissa replied. "After we found the radio buoy, we took our ship-habitat out into the Oort Cloud for a two-year survey. We charted the velocities of thousands of bodies whenever we could, and found nothing large enough to slow up bodies in their orbits to fall sunward. Of course, the Halo is large, and can be disturbed anywhere in the vast sphere it forms around the solar system. It takes only a small change in a body's orbital velocity to send it into the inner solar system. Our survey is still incomplete. The danger may well exist."

"Yeah," Jake said. "Or they're just taking a break, until the nurturers figure out what to do with us. I don't like this idea that some other culture knows what's best for us, or that it feels justified in deciding we shouldn't exist at all!"

Max realized that he felt the same way, and was glad that Jake had spoken up.

"You're right," Lissa answered, "but that may be just the way things are. And it may be that they do know what's best for us in some things."

"So where do we stand right now?" Jake demanded. "You're not even sure if any of this is true."

"Good question. Let's see if we can tie it all together. Everything that's happened since we discovered the signals from the stars seems to me to have been a way of getting us to think about our place in the Galaxy, and how we will survive the weeding process, whether it's intended or natural. We're past the era when we might have destroyed ourselves in a war or through ecological disaster, so it's possible that we're only being nurtured now. I don't think any civilization out there is longing to meet us, but they don't mind us overhearing what they're saying to each other, even though we don't understand them. We'll have to work at that, and I think they want us to. I'm certain we were meant to find this station, and to discover the link with Centauri, but I also suspect that we're supposed to have large doubts about what may be going on. Doubts protect us from being overly influenced by the weeders or nurturers. Our future remains an open possibility." Lissa looked at Max and Lucinda. "The passages you discovered and explored may be a learning maze, a labyrinth that is already teaching us to look beyond the more strenuous forms of interstellar travel. We've done it the hard way, by accelerating a habitat to relativistic speeds with enormous expenditures of energy—but now we know for sure that better ways exist, and that will spur our technical development. And one day we'll meet the Others, in the maze perhaps."

"I might have already seen them," Max said, "just for a moment, but I can't be sure."

"Did you see signs of intelligent life on the worlds you visited?" Lissa asked.

"No," Max said, "but there was life."

Jake asked, "What else are we *supposed* to learn about this station?"

"Perhaps they want us to learn to operate some of the systems here," Lissa answered. "Max and Lucinda did that when they explored the portal connections. There may be other things we can learn to do."

Max's curiosity raced, and he tried to imagine what else might be possible. For a moment Lissa seemed to look at him with keen interest, as if he might not be aware of how much he knew.

"It seems to me," she continued, "that the weeders and nurturers could not depend on the timing of natural disasters in the galaxy. For example, the nurturers might have to protect a promising species from natural disasters once in a while. A suncore station has enough energy to do a number of things. It could easily power a destructive beam to prevent comets and asteroids from striking planets, but such a beam could also sterilize planets to slow down the emergence of intelligent life. It could stop an intelligent species that turned out to be psychotic. One other thing. Stars aren't always stable. A station like this could adjust a star's energy output if something went wrong and a species was about to be destroyed. Or it could increase or decrease solar output and wipe out life."

Max noticed that his mother looked appalled. "Can any of this really be true?" she asked. Murmurs of disapproval filled the chamber.

"We're speculating about the details," Lissa replied, "but I think the larger picture is true, or something very much like it. I'm only following out some of the implications of what we've learned, not just recently from Max and Lucinda, but over the years since the signals were received. Let me put it this way: three decades of data are consistent with what is now happening, and few of us at the Institute are surprised. We can't wish away all the supertechnology around us."

"A lot has happened since we left," Joe said. "The manner of our return seems to have taken things a few steps farther."

"I don't like this much," Rosalie continued. "Was Earth's biosphere slowed up in the past so that we got a

chance to develop intelligence while other species, say birds or reptiles, didn't?"

"I doubt very much," Lissa answered, "that the nurturers were that specific. I think it's intelligence they value, whatever form it takes. They want it to grow out of its violent survivalist period, and look beyond tribalism, nationalism, speciesism, and the like."

Max heard Jake curse softly. "So we're being tested," he said in a shaky voice that betrayed his worry about Emil. "And if we fail, they'll hit us with rocks, or warm up the Sun, or just cook us to death with directed sunbeams. Who do they think they are?"

"They know who they are," Lissa replied. "I'm not so sure we know who we are. Some of us think we're angels. A lot of history suggests that we're devils. To a large degree, we're the first aliens we have to meet and get to know."

"We haven't had a war in over a century," Rosalie said.

"A century of peace is a good try," Lissa replied, "but it may be too soon to tell. The only accurate view we have of ourselves comes from our incomplete sciences, but it's inevitable that one day we'll see ourselves as others see us and may not like what we see. We should remember, when that time comes, that we haven't always liked ourselves either, which is a hopeful sign. Most of our literature and art shows that we are very ambivalent about ourselves, which is why so many books and paintings have been censored in the past. We have a lot of history to be ashamed of—the twentieth century, for example, may never be equaled for sheer destruction—and I'm not referring just to its wars and millions dead. To heat and cool cities and generate electricity, and to have the luxury of riding around in private vehicles, the people of that century nearly destroyed the ecosphere. On a more hopeful note, I think it's fair to say that humankind is capable of becoming more than it has been in the past, because we have shown great improvement. We must remember that."

"What if it's not enough for our judges?" Jake asked bitterly. "What if they've decided that we're going to fail? It happened on Earth. Entire societies disappeared because they couldn't keep up."

Linda stood up. "So what's next for us here and now? What if this station pulled us in blindly? What if this whole system is no longer in use, and is operating automatically?"

Lissa said, "We'll have to find out." She took a deep breath and looked around at the gathering. "I will have to leave you now. Captain Calder feels that we should make an exit run to make sure it works. Then we'll come back and decide what is to be done."

"But what if you can't get back in?" the navigator demanded.

"We have to risk it," Lissa replied softly. A murmur passed through the chamber. People stood up and cried out in protest. "It would be unfair," Lissa shouted back, "to take any of you with us now. We could take only a few. You're safe enough for now."

There was another outcry. The navigator raised her hands for silence. "I don't like it either, but it's best." The gathering quieted slowly. A few people seemed about to argue, but thought better of it.

"We'll be back as soon as we can," Lissa added, "maybe within a week." Max noticed that she was looking at him as she spoke, and then she motioned to him.

He got up and went over to her. "We'll talk when I come back," she said before he could speak. "Don't worry, I will be back, no matter what it takes."

Max nodded and turned away.

"Come on," Rosalie said, putting her arm around his shoulders, "we've got to get you home for some rest." Lucinda stood between her parents, looking lost as she gazed at him.

"We've got to go see if the passage to Centauri is open," Max said to the navigator.

"The kids need rest," Jake said, ignoring him.

Max wanted to object, but suddenly felt very tired. The bed in his room was waiting, in the house where he had grown up, in the habitat that was still a prisoner at the center of the Sun. He was trapped with the world he had feared losing so much. Lissa might never come back. We could be here forever, he thought, imagining aliens peering in through the brightness to study their catch of human specimens.

[|Go to Table of Contents |](#)

20

Max lay in bed, gazing out the window at the familiar curve of the countryside, and imagined his world melting inside the fusion furnace of the Sun. It might be a simple task for the aliens to destroy this station by shifting it from otherspace into the Sun's thermonuclear core, to rid themselves of creatures who had blundered into their interstellar web. But then why did the aliens go out of their way to trap the habitat? Certainly not to destroy it. He closed his eyes and imagined ice comets falling toward inner Sunspace from the Oort Cloud. Beams reached out from the Sun, vaporizing comet after comet, saving the Earth....

Were the aliens hostile or helpful? Was it a sign of friendliness to have let Lissa's ship in once? There seemed to be no obvious reason why they wouldn't let her ship back into the suncore again. But there was no way to know if the ship had even gotten out

He thought of Lucinda and Emil. Their ordeal had tied the three of them together, and changed them. He cared about Lucinda, and Emil was more than a friend, because he was part of Lucinda. Emil *had* to recover, Max told himself, or nothing would ever be right again....

He opened his eyes and sat up in bed. A late afternoon breeze blew in through the open window. He breathed deeply, feeling that he understood things a little better now, and would be able to sleep. Out there, around distant suns, waited the Others, the real strangers. Well, maybe not complete strangers, because they seemed to have involved themselves with human history. Did they know what they were doing? Were their aims good? Perhaps every successful species in the universe sooner or later adopted some younger one. Those who had gone ahead helped those who were just starting out, not out of goodness, but because everyone would benefit in the long run. Lissa was right about that. Knowledge and experience were too valuable to be wasted by isolation.

It made sense, he told himself as he lay back and tried to relax—unless the Others *were* in fact hostile....

A knock on his door woke him.

"Come in!" he called out, and saw by his wall timer that he had slept ten hours.

He got up and rubbed his face as the door slid open. "Max," his mother said, "please come out into the living room. Lucinda and her parents are here and want to talk to you."

"Be right there," Max said sleepily as he got up and started to dress.

Linda ten Eyck looked tense when Max entered the living room, but she smiled as she greeted him.

"What's wrong?" Max asked nervously, looking at Lucinda for a clue, but seeing only resignation. His own parents stood by the dining alcove.

"We came to see how you were," Jake said, "and to ask you to come with us to check the passage to Centauri. We must find out what's happened to Emil."

"I know," Max replied. "That's what I was thinking of doing."

"Lucinda and I will go with you."

"I have to be here," the navigator explained nervously, "in case the ship comes back." She sounded unsure, as if she didn't believe her own words. It seemed to Max that she had already accepted Emil's death and needed an excuse not to go.

"We can start right away," he said, eager to help. The navigator wanted him to go, Max realized as he looked at her.

"We've been very worried," she added, her voice straining. "You two got through safely, so you'll make good guides."

"If the way is open," Max said, "then all we have to do is follow the markings Lucinda made."

"We'll wait for you out by the lock," Jake said as they left.

"I've redone your pack," Joe said, putting an arm around him and looking at him with affection.

"I wish you wouldn't go," Rosalie said.

"I have to. We know the way, so it won't be dangerous this time. It'll take only a few minutes."

"Then why take a pack?" she asked.

Max was about to answer that it was better to be prepared for any obstacles, but held back. His mother didn't need to hear that now.

"Be careful anyway," Joe said, looking tired. "I'm very sad for Jake and Linda. Your mother and I go back a long way with them, so we won't forbid you to go."

Max said, "Don't worry, I'll be back."

Max kept looking over his shoulder as they made their way across the blue floor toward the place where Lissa's ship had landed. Only its return would prove that it had gotten out safely. They might never see it again, he realized, or even have any contact with Earth except the long way around, through Centauri, unless the passage opened.

Lucinda and Jake walked next to Max in silence. She took his hand, and let it go as they came to the column. The black and gray storminess still roiled inside it, and Max felt a renewed wariness of how space itself was folded up, foreshortened, inside this alien device, making light-years into a minute's walk through the dark.

"Which one?" Jake asked.

"Here," Lucinda said. "I marked it."

Max nodded. "We'll come out in another blue station, and pass from there to Centauri."

"Go ahead," Jake said, taking Lucinda's hand.

Max stepped through the square opening and slowly followed the curve to his right, quickening his pace when he saw the exit, and came out into the blue light of the identical station. Jake and Lucinda stepped out behind him.

"Here's another," she said with relief, pointing nervously to the next entrance.

"Ready?" Jake asked.

Max tensed. Lucinda took a deep breath and bit her lower lip. His stomach tightened as he faced the portal and went in. The darkness closed around him again. He hurried along the curve, hoping—and bumped into the barrier.

"It's still closed!" he shouted in frustration.

"We'll wait," Lucinda said with sudden calm as she came up behind him. "It might have opened and closed again."

"Sit down against the barrier," Max said. "It could be a while, or in the next few minutes." *It could be forever*, he thought, squeezing his eyes shut as he leaned against the barrier and slid to the floor.

A flashlight came on, its beam pointing upward. Jake sat down next to him and touched his shoulder gently. "We'll wait. If we're waiting too long, we'll leave and set up a round-the-clock watch with alarm transmitter links, and someone will always be ready to go through."

"Sure," Max said bitterly. He had imagined striding through to Centauri and finding Emil sitting up in his hospital bed, eager to hear what he had missed.

Lucinda sat down at his side, and Max held her as she rested against him. They waited silently for a long time, but the barrier did not fall. He heard a deep sigh, then stood up slowly and helped her to her feet.

Max distracted himself by reading and thinking about aliens during the next three weeks, convincing himself that he was trying to understand more of what had happened to him.

He and Lucinda stood watch at the column every day, ready to go through. They would pass through the two portals and always find the barrier up. They would sit against it, waiting, and Max sometimes feared that the window into Earth's Sun had also closed, preventing Lissa's ship from reentering the suncore station. The habitat might face a future of isolation and immobility.

When they were not on watch, Lucinda and he sometimes hiked out to the stream in the hollow and sat by the waterfall where he had always gone alone. She became withdrawn in the third week, and rarely spoke, and Max began to fear that he was only a constant reminder of what had happened to her brother.

"Don't you want to talk to me?" he asked one afternoon. "I know what you're feeling."

She stared past him, unable to speak, trapped within herself.

"Try not to let all this get you down, son," Joe said to him at dinner one evening. "Not until we know more."

"I'm not depressed," Max answered. "I'm just trying to understand." He was beginning to believe that it *had* all happened by accident. The alien builders were long dead and gone. The habitat had simply run

afoul of automatic systems, maybe ones that were no longer working as well as they had been. Emil, Lucinda, and he had been lured out at random. He wondered if the aliens were clever enough to have made it seem a chance encounter.

"This station and its portals have been here a long time," Joe said, "maybe longer than human history. We won't learn everything about it right away. I think you've done quite well so far, considering."

Max was silent.

"It wasn't your fault or Lucinda's that Emil got hurt," Rosalie said.

He looked at his parents. "I know it wasn't my fault, but I'll have to live with Emil's death all my life. It'll be stuck inside me forever. If we don't get out of here, I might never even find out what happened to him."

"I know," Joe said softly. "We all collect such things. Mine have never gone away, and never will. Don't think only of how it will be for you if he's lost. You'll get very confused if you think only of yourself."

"You and Lucinda will share a loss," Rosalie said, "if that's how it turns out, and you'll have to make it bearable for each other." The look of concern on his mother's face was intense. Max had never seen her this way. "I know that Lucinda sees her mother reliving the death of her brother on Mercury and feels guilty. Jake and Linda are dismayed that their daughter will have the same kind of loss to live with. And they're all worried sick about Emil."

Max realized that Lucinda needed him more than ever now, even when she couldn't show it. He would have to try harder to break through her worry and grief.

He stood up. "Don't worry about me," he said to his parents. "I'll be back late."

Lucinda was sitting on the grass in front of her house, and Max almost missed her in the twilight glow of the sunplate. He went over and sat down next to her.

"You don't have to talk or anything," he said softly. "We can just sit."

"I'd like to talk," she said suddenly.

"Sure," he answered, surprised. "Go ahead."

"You've been thinking about what's happened. I know you have."

"Tell me what you think first," he said.

"I don't think the aliens are malevolent," she answered. "They expect us to look out for ourselves. What happened to Emil was simply an accident."

Max knew she was right. It wasn't reasonable to expect the aliens to have set up warnings about poisonous vegetation on every world in their transport web, but he still felt resentful.

She frowned. "Why would they take the trouble to lure us out, to get us interested, just to be mean? It would make no sense, would it?"

"You're probably right."

"I am right. One day we'll know it all. You're not going to be the only one who will help figure it out. I'm going to be right there with you."

Max felt a rush of relief. "You have been thinking."

"Of course." She leaned toward him and rested her head on his shoulder. "Just feeling all the time makes you blind."

As he held her, Max knew that his fear of Earth, of returning to the large mass of humanity from which he had sprung, was gone, just as his father had said. His fears and doubts were probably like humanity's suspicion of the Others. He held the thought, because it explained him to himself. He was to Earth, and even to other people, as Earth was to the Galaxy. Earth would fear the galactic civilizations around it for a while, then would grow out of that fear, as he was growing out of his own. But there would always be new problems.

"I'm afraid for my mother," Lucinda said suddenly. "I think she'll hate me if Emil dies. She'll resent us both, Max, because we'll still be alive, while he won't."

Shaken by Lucinda's fears, Max went home. If she was right, and Emil died, then he might never be able to tell Lucinda how much he cared about her, how attracted he was to her. He had suppressed his feelings, hoping that he could tell her when all this was over.

As he walked up the road to his house, Arthur Cheney pulled up to him on his bike and stared.

"What is it?" Max asked, noticing that Arthur seemed shy of him. He had seen the same wide-eyed nervous look on the faces of the other kids lately; even Muhammad was more nervous around him. They admired him now, it seemed, but Max found it hard to enjoy the attention. Now even Arthur was trying to ingratiate himself.

"We've got the next watch together," Arthur said.

"I didn't know," Max answered.

"I saw you sitting with Lucinda. I guess she's really upset about Emil."

Max nodded, remembering when Arthur had been her favorite.

"He didn't like me much," Arthur said. "Maybe that's why she dropped me, when Emil gave her the word. I hope he's all right, but he was a little prick in some ways. Not that I'd wish anything really bad on the kid, but he wouldn't be much of a loss."

Max was silent.

"Well, it'd be too bad for Lucinda and her parents, I suppose, but it'd give you a clear way with her."

As Arthur started to pull away, Max put his foot into the front spokes, and the bike fell over. "You're a bit of a prick yourself," Max said as Arthur hit the ground.

"Hey!" the boy cried. "I thought you didn't like him at all."

"Yeah, well maybe I do, just a little," Max said, helping Arthur up.

[|Go to Table of Contents |](#)

wondering if he might get some idea of how the alien passages worked, when the Sanger twins came by and stopped at his desk.

"What was it like to be lured out?" Jane asked.

"Did you feel weird?" Alice added.

Max was about to explain when Muhammad Bekhter stopped to listen. Then Arthur Cheney and a few of his friends from the lower grade wandered by. Max found himself surrounded.

"Well?" Jane asked.

Max saw that a few of the younger kids seemed eager to hear what he had to say. Stories and inaccurate rumors had begun to circulate as soon as he and Lucinda had come back, now more than three weeks ago, and the level of curiosity had continued to increase in direct proportion to the few available answers.

"Do you really know why we're here?" Muhammad asked. "My father says everyone's just guessing."

"We can't be sure," Max answered, "but—"

"Your screen's flashing," Alice said.

Max touched the message release:

IM AT YOUR HOUSE AND WOULD LIKE
TO TALK WITH YOU—LISSA

"The ship's back!" Max shouted, springing up and pushing past the group. Voices babbled excitedly behind him as he hurried from the library.

He raced home on his bike, and was surprised to find Lissa sitting on the back steps to his house. She looked up and smiled.

"I promised, Max, remember? I've been here for a few hours, talking with your parents and Lucinda's. The announcement that we've returned should be going out to everyone here any minute now."

"What took you so long?" Max slipped his bike into the rack and sat down next to her apprehensively.

"We had some trouble with the ship," she said, "and I had to break a few bureaucratic heads, but I do have some good news, too."

"I thought you might not come back," Max said.

"I'm sorry for the anxiety we've caused, but it couldn't be helped. We found the other window, Max. It's just past the orbit of Venus. Alek—Captain Calder—thinks there may be others. It seems likely that we're being invited to come and go as we please."

"What do you want to talk to me about?"

"I promised we'd talk. But you're right, there's more. You're an important player in what's happened, and I want to find out more about you."

"About me?"

"Don't be so modest. I want you to come back to Earth, with a stop at Bernal One, where we'll go over

what you've already recorded. We have experts and facilities there that can help you get at things you may not have registered completely, or which you don't think important. Have you drawn your map?"

"Yes, I have, and I would like to come. Have you asked Lucinda?"

"Of course. I had a long talk with her. She was with the guards at the column when our ship was brought in. She thinks that the habitat should become our outpost inside the Sun, a staging area for further exploration of the portal system. She suggested it to her mother."

"That seems logical," Max said.

"We can't take the habitat out. Its drive systems are still dead, for no good reason at all, so she thinks maybe the habitat is supposed to stay here."

"Lucinda said that?" Max asked.

"Yes, and I think she's right. The navigator agrees."

"But you will be taking people out," Max said.

Lissa nodded. "We'll ferry out those who want to get back to Earth and other points in Sunspace, and we'll bring in fresh teams. Many of your habitat's people, the navigator told me today, feel they've put in the years they contracted for, and are anxious to get back to Earth, Mars, Bernal One and the Moon, where they have friends and relatives, or new jobs waiting for them. Many just want to retire and pursue their interests for a few years. Ferry service will begin as soon as we assemble ships at the Venus window."

"When do you want Lucinda and me to go?"

"How about in a few days? Your parents will be coming with you, of course. Lucinda's won't just yet. They're still hoping for news of their son."

"You know about the closed passage," Max said.

Lissa looked puzzled. "I still don't see why it should be closed. They wanted to show us their system, so we'd see how knowledge and mind could bend the limits of space-time to overcome distance. We've struggled with relativistic ships and radio, but nothing we've done can compare to using the very strength of suns for both travel and faster-than-light communications. The scale they've worked on is elegantly equal to the task." She sighed. "But maybe the builders no longer exist."

"They have to be there," Max insisted. "You've been monitoring tachyon communications for years, haven't you?"

"Maybe those are automatic, too, routine signals between suncore stations, old cybernetic systems babbling to each other."

"No," Max said. "That would be too disappointing." He realized that he sounded like Lucky Russell.

Lissa said, "I've been thinking that our suncore station is a kind of automatic cradle rocker, keeping our Sun adjusted, protecting the Earth from catastrophe. When you found the portals, it signaled to the Others that we were ready to look beyond our Sunspace, that we could appreciate, if not fully understand, what they had left for us to find." She looked at him with interest. "What do you think about the way the three of you were lured outside?"

"I think they only weakened our resistance and let our curiosity lead us," he said. "It's not too different from sleepwalking. I've read some stuff about that. Have you ever walked in your sleep?"

"A long time ago."

"Well, what happens is that you know, in a distant way, what you're doing. At least that's what it's like for me. You feel you have to do something, even if it makes no sense. When you realize it's crazy, your mind regains control and you wake up. It's as if dream states are a different way of being awake, maybe a simpler one, and you're only completely awake when all the different parts of your brain work together."

She nodded. "That's interesting, Max, but we couldn't do what they did to you. Hypnosis is the closest."

"I know," Max replied. "I wasn't affected at first. I just went along with Emil and Lucinda when they came to get me. I felt it when I came outside, and later. Other people were affected, but were stopped, so we weren't the only ones."

"But that was later. You three were the first. Any ideas?"

"Maybe just chance," Max said. "We happened to get scanned first, if that's how they did it."

"Or the system could only handle three at a time?"

"Maybe. Or maybe we were more suggestible."

She smiled. "I guess we won't know until they tell us. What plans have your parents made?"

"Dad wants to visit New York. He grew up there. Mom will probably visit her father on Bernal One, if he's still living. After that I don't know."

"What do you want to do?" she asked, looking at him carefully.

"I'm not sure," he said, looking out across the length of the hollow. It seemed too small, suddenly, to become a crossroads to countless worlds. Its importance would grow, but his endless days of school and private afternoons were over, and he was no longer sure that he would miss them. But where would there be a new place for him?

"Would you like to study at the Interstellar Institute on Earth?" Lissa asked.

Max looked at her with surprise and interest.

"I think you have the aptitudes," she said. "Our main activity, besides teaching, is the study of the alien signals that crisscross the Galaxy. But to that we'll now add exploration through the portals. You'd come to your studies with a lot of experience, which at the Institute counts for very little if you can't get knowledge out of it, but talking with you makes me think you'll know how to make the most of what you've seen. You're lucky. The kind of discoveries you've made often come at the end of an explorer's career, not at its beginning."

"Do you teach at the Institute?" Max asked, feeling a growing excitement.

"I often lecture at the teaching center in the Himalaya Mountains. But we also have research branches on Lunar Backside, Bernal One, on Mars, and a research habitat in the Oort Cloud." She shook her head and smiled. "Those signals. They fascinated me when I first came to the Institute, at about your age. Now more than ever they seem to me to be the conversations of adults, and we're the children who know they're probably being talked about, now and then, but can't understand a word." She looked at him, and

it seemed to Max that this slim, attractive person couldn't be very much older than he was. "You'll get a good college-level education at the Institute, and you'll meet people who have odd and creative ways of looking at things, as you do. You'll see the Himalaya Mountains."

"But will the school take me?" Max asked.

"My recommendation will be enough. Remember also that you're one of the first interstellar explorers now. You've used the alien passages, and you've been to Centauri twice—the hard way and the quick way."

"I wasn't alone," Max said.

Lissa nodded, "Lucinda has shown interest, and I think she has ability, but she and her parents can't make any decisions until they find out about her brother."

"I know she'd want to go," Max said, "but I don't know how she'll feel if she finds out that Emil is gone."

"I know you want her to attend," Lissa continued, "but you should go even if it's by yourself. I should also tell you that you'll both be given the most thorough medical exams you've ever had when you stop at Bernal. I don't think we'll find anything, but you did travel through the passages, and we have to know if you were affected."

"I understand," Max said. Things were moving faster than he'd expected, leading to a new choice just as he was freeing himself of his doubts.

"I've looked at Emil's school reports, too," Lissa said. "If you're wondering whether he would be accepted by the Institute, the answer is yes. He's very smart, much smarter than you probably knew."

Emil's struggle with the alien toxin was probably long over by now, Max reminded himself. Even if he survived, he might never be himself again. For a moment Max felt as uncertain and afraid as when the habitat was approaching Sunspace. But when he looked at Lissa and saw the confidence in her face, he felt encouraged.

"I'll come," he said with a twinge of guilt, "no matter what happens." Lucinda would want him to go, even if she couldn't. He imagined her berating him for his hesitation.

"Are you sure?" Lissa asked.

"I'm sure," Max said against his doubts.

[Go to Table of Contents](#) |

22

Two ships waited when Max and his parents went out across the great floor to Lissa's vessel. A week had passed since her return. There would be at least one ship a week from now on, taking people out and bringing others in. Lucinda and her parents were already at the ship, saying their farewells. Max peered in the direction of the column and made out its vague shape rising into the bright blue glare.

Linda and Jake tried to smile as Max and his parents approached, but the strain in their faces had increased.

"Take good care of her, Max," Linda said.

Lucinda looked at her mother. "I'll be back in a week or two, and I won't decide anything about the Institute before then."

"We'd come with you if we could," the navigator said, embracing her, and Max had the feeling that they had decided it would be better if their daughter went away for a while.

Jake and Linda would stay on until the new administration of the habitat took over. There had been rumors that they might even sign new contracts. They were still hoping that the passage might suddenly open. Max had heard that they were even willing to try the other portals in the column, on the chance of finding another route to Centauri, rather than wait four years for news of Emil to arrive by radio.

Suddenly Jake was talking to Rosalie and Joe was saying something to Linda. Captain Calder shouted down the gangway. Max stared back across the bright, solid sea of floor at the massive, half-submerged shape of the habitat. The rough outer crust seemed primitive next to the hard alien surface. The stone that Earth had thrown into the Universe had come to rest here, inside a star.

"All aboard!" Captain Calder shouted.

Lissa came out next to him. "Come on folks, time to go."

Joe and Rosalie started up the ramp. Max looked at Lucinda, but she was staring toward the column.

"Look!" she shouted, pointing.

Two small dark shapes were moving toward the habitat. Lucinda bolted and ran toward them.

Max sprinted after her, suspecting that the figures might be only two guards returning from their watch at the column. He caught his breath, unable to see clearly at this distance. They could be two people from Centauri, bringing bad news about Emil.

"Slow down!" he shouted, straining to catch up.

The distant figures stopped. Max slowed as Lucinda raced on.

"Emil! Emil!" she shouted to the blurry shapes, as if her words would make it so.

Max halted for breath. His stomach tightened as he followed at a fast walk.

She reached the dark shapes. He stopped and turned away, unable to look, expecting to hear her cry of disappointment. After a moment, he glanced back and saw that she was embracing one of the figures.

He hurried toward them, and recognized Emil.

The boy had lost weight, which made him seem taller, but he looked well. Lucinda hugged him, stepped back, then hugged him again, laughing.

"Max!" Lucky Russell shouted, coming toward him. "The barrier let us through, but now I'm stuck here."

"It closed up behind you?" Max asked, recovering from the welcome shock of seeing Emil.

"As soon as we came through," he said, putting his arm around Max. "It's great to see you. You did the right thing to go through."

Emil was okay, Max told himself as if in a dream, and in a moment he was embracing him, holding him close, as if he might suddenly dissolve, and Emil didn't seem to mind.

"The antitoxin stopped the alien stuff in me a day after you left," he said, squeezing Max back. "I'm glad to see you, too. Thought you'd gotten rid of me for good, huh?" He pulled free and grinned, and Max grinned back.

"We're leaving for Earth," Lucinda said with tears streaming down her face.

Emil looked around. "So they found us. Where are we?"

"Inside the Sun," Lucinda said, sniffing.

"And that's a ship from Earth," Max said, pointing.

Emil's eyes grew wide as his jaw dropped. "No kidding? The ship I believe, but the Sun?"

Then both sets of parents caught up with them. Linda pounced on Emil. Jake couldn't get close, so he embraced them both. Joe and Rosalie stood aside, their eyes glistening from relief. Max's throat tightened. His knees felt weak. It was all over. Emil was safe. He could finally let go of the doomed feeling that he thought would be with him forever. He glanced at his mother, and saw that she knew what he was feeling. Joe went over and shook hands with Lucky.

Lissa reached them and told Emil that Max and Lucinda were leaving. "You're part of the team," she finished, "if you want to come. Max and Lucinda can tell you everything on the way."

"Is he well enough to go?" his mother asked.

"He's just fine," Lucky said, looking around at the station. "We wouldn't have dared let him try to get back here if he weren't."

Jake looked at his wife. "You go along," he said. "I'll run things here for you." Linda did not object.

"I can't wait much longer!" Captain Calder shouted from the ship.

"Don't worry about him," Lissa said with a touch of affection. "Our schedule isn't that tight." She looked at Lucky Russell. "Want to come along? We can take one more."

"Oh, no," he replied. "I'd much rather look around this place first. Reminds me of an old joke about an expedition to the Sun. They were told it would be much too hot to land on, but that didn't bother them at all."

"That's the joke?" Max asked.

Lucky smiled, obviously ready with the punch line.

"They landed at night," he said.

[|Go to Table of Contents |](#)

23

As Max watched the big screen in front of them, the black globe of the alien station grew smaller behind the ship. A ghostly image of the Sun's otherspace echo flickered faintly, as if struggling to rekindle the full fire of reality.

"We're at the window ..." Captain Calder's voice said over the ship-com, "... and going through."

Suddenly the strange gray space was gone. The screen blinked and filled with stars in the forward view. The view aft stayed as an inset, showing the Sun, now restored to its fierce electric glare.

"This window," Captain Calder announced, "lets us out three million kilometers from Earth orbit."

"There's Earth," Lissa's voice added.

It seemed just ahead on the screen magnifier—a blue-green oasis in a jet-black sea, warmed by a yellow-white sun. The Moon stood guard nearby, pockmarked from battle with cosmic debris, but still copper-bright.

Joe leaned over from the seat behind Max. "Still worried about all the billions on Earth?"

Max shot a glance at Emil and Lucinda next to him, but they were looking at the screen and had not heard his father's question.

"I don't see a single one of them," Max whispered back.

His mother's hand touched his shoulder.

"It doesn't bother me any more," Max said, deciding that he didn't care if Emil and Lucinda heard.

"Hey, Max," Emil said. "We couldn't have just run into one of these windows by accident, you know. I think they move, and one of them found us when the habitat was coming in. The Others thought we were ready, so the suncore station reached out, dropped a window around the habitat and pulled it into the otherspace station."

Max thought about the idea. "That's really good, Emil. It might even be true."

"We've been moving outward in small steps for over a century," Joe said. "You three took a large one. One day we'll turn a corner in one of those passages—"

"They're *curved*, Dad," Max said.

"—a curve in one of those passages and meet the Others. We'll be ready for them then, even if we don't realize it."

How many civilizations are out there? Max wondered, looking at the ocean of stars on the screen. He wanted to be there when his kind met the Others face to face. He would know how to reach out—and he had a few questions they might not expect him to ask, like what business it was of theirs what happened in Earth's Sunspace, even though he had a good idea of what their answer had to be ... and he might even agree with it.

"Remember the way you felt about Earth," Joe said. "We're all in the same boat as far as the Galaxy is concerned. We're just as alien as any aliens out there—maybe more so."

"I know," Max said, looking over his shoulder. Rosalie smiled at him. Next to her, the navigator relaxed with a peaceful look on her face. She seemed about to have her first good sleep in weeks.

Max looked back to the stars on the screen. How many of them, he wondered, had been harnessed to feed the net? He tried to imagine the uses to which such a vast reservoir of energy could be put.

"I feel confident about one thing," his father said.

"What's that?" Max asked as Lucinda took his hand.

"That maybe someone out there is hoping that our kind will make something of itself."

Lucinda's hand tightened around his. "We will," Max said.

[Go to Table of Contents](#) |