

The Forest Between the Worlds

by G. David Nordley

A persistent buzz against his wrist drew Akil Mateo into reality from deep sleep. "Kita?" he mumbled, and reached beside him. Empty air. Where was she? Where was he?

As sleep faded, he found himself in a hammock of fine netting beside a hut in a clearing in a forest. Where? Memories flooded back into consciousness. He was fifty-one light years and change from Earth on the planet Haze and Kita was long gone.

He felt another buzz on his wrist and hit the wait-a-minute bump on his com patch; so much for sleep. He wanted to think it was a bad dream, but seven weeks ago, as he had experienced time, he'd come home to find her things gone and a message telling him that their sixty-three-year marriage was over. He'd jumped at a chance to head out here and put all the reminders far, far behind him. But his dreams and the emptiness beside him were the greatest reminders of all and they followed him everywhere.

His com patch buzzed again. He shook his head, yawned and stretched. After almost forty hours in the field, his body felt like lead in spite of the one-tenth gravity. It had better be important.

At least this was a cool day, not much over 30 Celsius, he imagined, and with just a faint but very welcome breeze. The vast cloudy globe of Shadow, overhead, was already a waning crescent and the upper reaches of the interforest were already lost in darkness; in less than an hour, their sun, Oshatsh, would vanish behind it for twenty minutes. Three hours later, true night would fall. Here, between the twin worlds, the exhausting pace of six-hour days nearly doubled.

Buzz. "Hello?"

He looked at the image on the tiny screen stuck to his wrist. The shaved head of a woman stuck out of the tall, gently undulating low-gravity waves in the nearby lake they used as a swimming hole. The subtext told him the call was from Marianne Jones, a biological researcher he'd met a couple of standard days ago when he'd come down to the base.

"Akil Mateo?" she asked.

In her Australian accent, the last syllable of his name came out "kill" instead of "keel." He sighed.

"Ah-keel here," he said, exaggerating the pronunciation slightly. "Just woke up. What is it?"

"Sorry, but you're the only one around. Could you check Sharada Fina's hut and see if she's there?" Her voice sounded worried. "I've been getting no answer from her com patch for the last hour."

"Sharada Fina? The anthropologist? Rumored to be going native?"

Jones frowned. "She may be up in the forest. If so, she's overdue."

Akil blinked. "May be? Didn't she check out?"

"Maybe through her system, but it's got a privacy block. Base ops says her com patch is still in her dome with vital sign monitoring off. That's okay if she's in her dome, but I'll bet she left it there."

He automatically ran the fingers of his left hand over his com patch, feeling the discrete bumps of its few manual controls. A com patch was generally deemed too unobtrusive for the Forest People to

understand as technology, as long as you didn't let them touch it or use it in their presence. His matched his skin color so well that he could barely discern its circular outline. "Leaving the com patch behind is going a bit far, isn't it?"

"Tell me about it! Sharada talked Uma Weiss into keeping technology out of the forest. Uma made an exception for com patches, but Sharada doesn't like even that. Look, com patches record everything, so I think tech transfer is a smoke screen—she just hates people looking over her shoulder up there."

"How does she record her data?"

"She dictates it when she gets back to a stand-alone system, then puts out an edited report."

He looked at the darkening band of green between the worlds. While the interforest wasn't particularly dense, there was a lot of it and, he recalled, some vines were actually conductive. "Maybe she's shielded by the vines."

Jones shook her head. "I've never had any problem. I think she just wants to have her ducks in order without back-seat drivers while she fights the battle over how intelligent they are."

Akil sighed. "I see. I'll check it out." It made sense. In addition to technological hygiene, leaving the patch behind would help preserve Fina's data monopoly.

He got up, stretched, and swung his legs off the hammock. The curly "grass" smelled vaguely like ginger as it squished beneath his bare toes. He glanced at his shorts hanging on the hammock support and shrugged. The heat led the ground staff to be very casual around the complex, for comfort. Well, he'd held out for two standard days to the likely, though politely unstated, amusement of everyone here. To hell with it. He smiled at himself; talk about going native.

He dug his toes into the turf and pushed off, remembering to lean well forward to minimize his air resistance and maximize his traction. People told him it got to be automatic in a few standard days, but it was still very artificial for him, fresh from the one gravity of the star base. It felt okay as long as he concentrated and didn't have to react.

Two modest gliding strides took him across the compound's central area to Dr. Fina's dome. Like all the others, it looked like one of the three-meter ramshackle nests of sticks constructed by the pseudosimians. But there was a modern door set back in the shadow of the semicircular opening, and the huts came equipped with all modern conveniences. Not too surprisingly, the door didn't open as he approached.

"Open," he said anyway. It didn't.

Akil shrugged. She could, of course, be sleeping. Akil pursed his lips and ran a hand through his curly, jet-black hair. One didn't violate a colleague's privacy lightly.

"Jones? Are you copying this?"

"Yeah. She could be in there screwing that amber-furred Forest Person with the black ear tips."

"Screwing? Do you really think anything, uh, vaginal is involved?" The Forest People had only one area of anatomical resemblance to people, but that was a prominently displayed embarrassment. He considered himself open minded, but the idea of her letting one of the round, furry, vaguely spider-shaped beings stick its organ into her body in the name of science was a little beyond him.

Jones groaned. "Akil, everyone knows she's been screwing the things; she's said as much herself. She likes to shock people. Like standing in front of me covered with nothing but dirt and scratches and saying

'oh, yes, I did' when I'm open-mouthed and saying 'you couldn't have.'

"But she's serious. She thinks they do it to exchange data encoded in molecules as well as to bond with their group, like the Bonobo. Well, she's bonded all right. Addicted is what I'd call it. But I don't think the Forest People are doing anything more than following instincts."

"I understand there's some debate about that," Akil said, with some understatement. The dispute concerning the intelligence or not of the Forest People was more like a minor war among the staff. He tried not to take sides, but if there were genuine intelligence on these worlds, it had reacted very slowly to their presence. Or maybe it was just watching.

"Debate, hell! We're just spinning our wheels. She's got all the data because she's the only human being on this planet the Forest People accept, because she's the only one that would ever be willing to do . . . *that!* I don't know why I care."

Akil found himself momentarily speechless at the display of feeling and wondering whether Jones and Fina had some kind of relationship. Meanwhile, he stood in front of Fina's door feeling like an idiot as he confronted her dome's cyberservant.

"I'll try again." He spoke toward the door. "Will you at least tell me if Dr. Fina is in?" Akil asked it. "I don't need to bother her, just tell me if she's in. We are concerned. If she is in and you don't tell me, she may be inconvenienced unnecessarily in our efforts to find out."

"I have been instructed not to answer any questions."

The hell with it, Akil decided, and struck the door with the flat of his hand. It made a low, hollow woody sound. "Sharada Fina!" he yelled. "We just want to know if you're home."

"I'm doing something private," her voice answered. "Please respect my privacy."

"Sorry," Akil said and turned away, embarrassed, then stopped.

Something seemed wrong with her voice, he thought—her intonation or timing. A lack of tension, perhaps, or natural irritation?

"Dr. Jones. . . ."

"I heard, and I don't believe it either. It's a sim. That woman's headed for a disciplinary hearing. Base ops, I'm formally requesting authorization to take control of Dr. Fina's dome system. Explain things to Commander Richards. Hang on, Mateo, I'll be right up there."

The ground base computer acknowledged its instruction. Akil's intuition told him that after the ten minutes of lightspeed delay plus however long it took to get Commander Richards' attention and decision, they would find an empty hut with its robot AI dutifully following its master's instructions to simulate her presence for as long as possible.

Jones came bounding from her swim in long low-gravity strides, large droplets of water still trailing from her lightly tanned skin. She was a big, athletic woman, a bit darker than could be accounted for by the trickle of ultraviolet light that managed its way through the vast, distended Hazian atmosphere. Polynesian roots, he suspected. She was, perhaps, five centimeters taller than Akil's 175.

Like everyone in this hothouse climate, she shaved her head, but her fuzziness indicated the last time must have been a couple of weeks ago. She grabbed a tree to slow herself and her large breasts kept moving in low gravity slow motion for some time after the rest of her body. The effect was surreal and,

involuntarily, Akil grinned.

She rolled her eyes upward. "Low gee, Mateo—get used to it. She's not in there, is she?"

He shrugged. "I'd guess not."

Akil felt his com patch buzz against his skin. "Go ahead," he said.

"Marianne, Akil, Sam Richards here. We've done a minimal override of Sharada's AI instructions to let you in. We've had a little discussion up here, but the upshot is that she's not there and you should probably go after her, promptly, and reel her in if you can. The two of you should be enough—a crowd would probably upset her and the Forest People. Everyone else is out in the field anyway. So you two have got it.

"I'm sure it's not necessary to remind you, but for the record, please avoid doing any violence to the Forest People, even to save Sharada's life; she knew the risks and took them voluntarily. If there is any hostility, we might lose any chance of a peaceful evacuation; not the sort of calling card we wish to leave. If you can't reel Sharada in within a standard day or so, come back and we'll regroup. If you have any questions, handle them locally. Don't wait for another fifteen minutes of lightspeed delay. Okay, you've got the ball now. Get going. Stay in touch with the ground base and good luck. Richards out."

"We've got the ball?" Akil said, wondering how he'd gotten himself in that position.

"I guess so. I'll go in," Jones said, ignoring his qualms. She turned to the door. "Open."

This time the door slid open without a fuss.

Fina's hut was full of forest things and standard equipment. Everything was there in perfect order, including her field suit and survival kit. The com patch was lying on the pillow of her web hammock.

"This isn't like her, all neat and everything in order. It's as if she expected people in here before she came back. Chaos!" Jones exclaimed as she touched the field gear. "I wonder if she took *anything* this time?" She seemed worried to Akil.

"Is that dangerous?" he asked. He knew the biochemistry was different enough that people wouldn't be nourishing to Hazian predators. There were some basic compounds in common: water, methane, alcohol, and some sugars, and a few other simple organic compounds, but most of the complex stuff had gone in different directions.

She shrugged and pursed her lips. "Not as far as we can tell, at least for short periods. The biology generally leaves us alone, though you have to watch out for some plants that can't tell us from the natives. There's water if you know where to look and some edible fruit. We can do without the nutritional supplements for a few days."

Akil nodded.

Jones frowned. "But, Mateo, we haven't been here long enough to think that everything *isn't* dangerous. Sharada's given up thinking."

"You think she's in over her head?"

"You better believe it. A lot of people do. She claims she's gained acceptance by mimicking all this touching, stroking, and screwing, and she thinks she's picking up something at least on some level; she likens the process to averted vision—she says she now gets feelings about things after she does it, as if the

Forest People are picking up on her chemical language and manipulating her feelings. But when you ask her what she understands, she can't translate."

Akil looked her in the eyes. "It sounds like there were all sorts of warning signals that something like this was going to happen."

She shrugged. "Mateo, a warning has to be exceptional. Alarms that are on all the time are just noise. Uma Weiss is getting ready to recall her, but I think that's more because of the time Uma's daughter, Olympia, has been spending with her."

"Olympia's what, twelve? You're not suggesting . . ."

Jones shook her head. "That would be going too far, even for Sharada. Besides, Olympia would never go anywhere without her com. But Uma's getting worried."

Feeling *he* was getting in over his head, Akil wanted to change the subject and gestured to some long pointed wood poles leaned against one of the walls in Sharada's dome. "Those look a lot like spears to me."

Jones shook her head. "No reports of them ever using them that way. I see them sticking out of vines here and there, with Forest People using them as perches, to avoid contact with the vine. If you come in contact with a vine, it starts to envelop you with sap and digest you; that's how the forest stays clean."

"So the Forest People sit on the sticks and don't get enveloped; that sounds intelligent to me."

Jones shrugged. "Look, 'intelligence' is a catch-all for a lot of different talents, and these things might even be able to do biosynthesis faster and better than we can, but for a race that's supposed to be on the verge of intelligence, the Forest People don't seem to interact with us as much as parrots or chimpanzees back home. Of course, I'm more of a biologist than an anthropologist."

Akil shook his head. "I wish we had plausible simlicrons."

"In a month or two, we will. We need enough data on behavior and chemistry to fool beings that perceive right down to the chemical level."

"Like dogs?"

"Dogs with hands smart enough to retroengineer the the robots and resent the intrusion. We aren't there yet, and until we get there, our data gathering has to be open and in person."

"And that person is Sharada."

Jones smiled. "Look, I understand that much, about not wanting to leave everything to the robots. Maybe she thinks she can do something before they arrive. She's probably just ten kilometers up at their usual meeting place. It should take us three hours to get there, max. A stroll through the park." Jones smiled. "With a couple of surprises. You'll enjoy it."

"Like this?" He spread his arms to indicate his nakedness.

Jones shrugged. "She does."

Akil felt very uncomfortable about that.

Jones laughed. "You should see your face. I was just kidding. Grab your coveralls and the standard low tech survival stuff. I'll grab her kit, too; she's been away too long and may need the supplies."

Akil was still nervous. "I'm going to ask Stavros to follow up, just in case." The ground base geologist had struck Akil as reliable.

Jones, who had started to gather Sharada's things, turned and shrugged. "Whatever. It shouldn't be necessary. By the way, I'm Marianne." She stuck out a hand.

He took it. "Ah-keel," he said with a forced smile. He was not going to put up with "ackle" for hours on end. He looked into her eyes. He hardly knew her, but she'd been on the surface over a month. Was she someone he could trust?

Her eyes were steady as if she were checking him out as well. "Ten minutes?" she asked.

He nodded. "Sure. I'll meet you at the north end." Oshatsh vanished behind the limb of Shadow as he said this, and the sounds of the surrounding forest changed as the light dimmed.

* * *

Akil returned to his hut and found a fresh set of coveralls; they were light and roomy and as tough as a fabric made from local fibers could be. They had an open weave to allow plenty of circulation, but he started sweating almost as soon as he put them on. He pulled on some lightweight boots made from a stiff open weave with gripping soles made from some hardened local resin.

His field kit was still packed from his previous foray, but he double-checked it. It held nutrient supplement pills, a roll of tissue, a pack of medical patches of various sizes, a polished obsidian knife in a fabric sheath, a mesh water flask lined with a rubbery native leaf, and some other useful things made of materials unlikely to surprise any natives. If, he reminded himself, they really had the wits to be surprised. He slipped the kit onto his back.

Thinking of the nutrient pills, he took a couple and gulped them down with a glass of water. They could forage for bulk; several Hazian fruits and leaves were edible, though of incomplete nutritional value. Thus equipped, he hurried out the door to their rendezvous and waited.

Full day came again as Oshatsh rose from the misty edge of Shadow above, this time on his side of the interforest. His feelings of irritation at having to use some of his time to rectify someone else's screw-up subsided. This expedition had all the makings of a minor adventure and a distraction to keep his mind off his failed marriage. He'd fled his loss, but it followed him in his mind. What had he done so wrong for Kita to discard him like so much excess baggage after sixty-some years?

Stop this, he told himself. Look around you and get your mind on the forest. The brilliant sunlit mountain of green crept up from Haze as if it was growing toward Shadow while he watched, too big to comprehend at a glance. But he knew that under it sat one of the largest volcanoes ever found; the inner pole shield was over twice the linear dimensions of Olympus Mons and the enveloping forest was likewise monstrous. It grew up from the volcano out through the L1 point and spilled down onto the surface of Shadow, a huge hollow tube of long hollow trees and alien vines that bridged the 250 kilometers or so between the twin planets. Even at the edge, the largest "trees" jutted more than a kilometer above the volcanic ash soil.

The biology and structure of these trees, Akil knew, had little in common with trees on Earth, but "tree" was what they looked like and "tree" was what they were called. At ground level, they stood an average of almost a hundred meters apart, like the pillars of some gargantuan temple. The biggest of them resisted even lava flows, and scans showed that some of them extended down through a billion years' worth of built-up rock.

Black, pyramidal mushroom-equivalents jutted two and three meters up from the forest floor reeking both fetid and sweet. Like everything on Haze and Shadow, except where an eruption, storm, or recent impact had caused a kill, it seemed to be a climax forest, or even more than that, a collage of living fossils some of which might be older than multicellular life on Earth.

The trees frequently hosted vines of comparable scale, which apparently did them no harm. Beams of light lanced through the mists of the upper canopy. An eerily ape-like pseudosimian cavorted in the vines far above them. Shape prejudice made them seem like relatives, but the consensus was that they were less intelligent than, say, terrestrial opossums.

"Damnedest thing you ever saw, isn't it?" Marianne said, coming up behind him. "Ready?"

"Ready," he replied.

"Grab a walking stick." She gestured to a stand of "beetle plants," whose overlapping iridescent leaves had reminded someone of beetle wing covers.

"Walking sticks? Marianne, it's only a tenth of a gravity up here and these packs mass less than four kilos!"

"Which means a lot less weight to steady you and less friction to stop you—though your momentum is as much as ever. We need the balance aid. Also they're useful for clearing plants away and avoiding close encounters with Hazing life of the slobbering kind. They can't eat us, but they don't all know that. We can't use anything technological but our com electronics in here. But what we can have is a stick. Take one."

Too warm and uncomfortable to argue, Akil just nodded and pulled the stiff leaves off what seemed a suitable staff, though with more effort than he'd have guessed. What was left reminded him of bamboo.

Marianne led, bounding off toward the tree line. He followed.

The forest had a profusion of detail, but all the details looked much alike to Akil.

"How do you know where we're going?" he asked.

"Look for the yellow-brick-fruit tags." Marianne pointed above with her staff. "There's one."

Akil looked for a while and finally spotted a basketball-sized yellow globe hanging from a low branch, patterned with what looked for all the world like alternating rows of yellow bricks. A few more seconds of searching revealed another one about thirty meters ahead.

"Those are native to the outer pole archipelago, so any that you find here, we put there. If you pick them before they get ripe, they seem to last forever. At least they've lasted for the couple of months since we've been here."

"Okay, we follow the yellow-brick-fruit road, then."

Marianne laughed at the reference. "That's the general idea. The Forest People always come down the same base trunk to visit us. We'll assume she went up the same way. The path slants up the aureole wall, then heads straight up the mountain till we get to the first base trunk ring, about ten kilometers from the central caldera. Then we circle north until we hit the right main trunk and ascend about ten kilometers."

* * *

An hour into their trek, Akil noticed that the canopy blocked the view above, forming a green and yellow sky. Oshatsh, approaching the horizon now, shone under this, and the shadows of tree trunks became more and more numerous until the effect was one of shafts of sunlight reaching in, rather than individual shadows. But there would be no problem with light until the eclipse. Oshatsh set was a long-extended affair, as light refracted through the least curved horizon of the deep atmosphere—and the vast half globe of a waxing Shadow would light the sky for another hour, though less and less as the umbra of Haze bit into it. He looked for spots, but Oshatsh was a settled old K5 star with a generally placid surface.

For the next hour, the path led up the slope of the volcano around which the forest grew. The terrain was awesome; huge blocks of "ah-ah" lava as large as spaceships jutted up through the carpet of debris, massive trunks and vines headed endlessly skyward into the mist, and webs that seemed made of thin vines filled in much of the space. Though he had "flown" through it in virtual reality, clearly any real flight by anything much larger than a duck was impossible. Sticking close to the ground, they got under most of it and lifted up any obstructing web with their walking sticks.

"Where are the spiders for these webs?" he asked.

"The webs *are* the 'spiders,' " Marianne said. "Sort of. Look, we've given these things descriptive common names according to whatever they remind us of from home. But never forget that webs aren't webs, pseudosimians aren't apes, and flying elephants don't act anything like terrestrial elephants. Look, over there. A web's got a butterball."

He looked in time to see a web collapse around what looked like a yellowish soccer ball. The soccer ball had a beak like a parrot's at one end and four ridiculously small, claw-tipped wings arranged around its belly. It squawked once, then vanished from view, as layer after layer of white netting wrapped itself around the struggling creature.

"Vicious," Akil said.

"That's why you don't often see butterballs this deep in the forest."

"Are the nets dangerous?"

"One of them started to wrap me up once, but spit me out before completing the job. I got an interesting pattern of acid burns out of it, but they healed in a couple of days."

"Sounds like fun."

She shook her head. "Cured me of going bare-assed out here. I wrote the page on the nets; how much study did you get in before they sent you down here?"

"Level three on fauna. . . ."

"That was flora, Akil."

"Oh." Unfortunately, Akil had never been that interested in plants.

"Just try not to touch anything but rocks, trees, and blackleaf vines, and you'll be okay. Don't rest on the large elephant-ear leaf vines. They grow around things—quickly, by plant standards."

Using paths filled in by forest debris, they made good time through the ah-ah field. The shade gave little relief from the heat; this deep in the distended Hazian atmosphere, heat was borne by air more than light. Akil brushed by something that looked like a loose ball of spaghetti with long thorns that made a sound like ripping paper as they scratched across his coveralls. He felt a sharp sting as one of them penetrated

the weave.

"Porcupine Plant," Marianne said as she saw him pull it out. "The quills can be a nuisance."

He nodded, ruefully.

As they ascended, the lava field changed from the blocky ah-ah into a more smooth, ropy pahoehoe, but on a scale ten times what Akil had seen on Earth. The largest lava tubes under them would be immense, and he savored the thought of exploring them.

What appeared to be a clearing opened beyond the trees to their right, looking at first like a slightly raised meadow. Akil suspected otherwise, and confirmed his suspicions through his com patch.

"Marianne, can we hold up a bit?"

"Uh, sure. Whew." She looked like she could use a break. "We're almost there, anyway."

"Ever been over there?" He nodded toward the clearing.

"No. A crater?"

"The main east vent. We think it's going to be active again in a few days. Want to take a look?"

Marianne took a breath. "Eclipse is coming up. I want to be on the tree by then."

It was getting darker; Akil knew that far above the canopy, the shadow of Haze had started to cover the almost full disk of its sister world. Mid eclipse would bring real night.

"Just a quick look?" he asked.

"Okay. Quickly."

They hopped up the slight rise in a couple of minutes and were rewarded by a kilometer-wide hole in the ground filled with smooth, flat, lifeless rock. Dim in the diffuse fading light, the forest rose around it on all sides like some kind of giant's cathedral. High overhead, individual trunks and vines lost themselves in the misty gloom.

"Chaos, what a place!" Marianne said in a hushed and awed voice.

Akil smiled. Then he saw what he was looking for. "Steam," he said, and pointed to his left. "Over there on the rim." Thin white tendrils rose there, easily visible against the almost-black of the forest.

"Akil . . ."

"What?"

"Down below. In that big wide crack. I see a glow."

Akil stared, couldn't see anything at first, and turned to Marianne to tell her so, but as soon as he averted his vision, the red glow jumped out at him a little further along the crack than he had been looking. "Good eyes! If things go as predicted, that hole could be full of molten lava in a few hours. Okay, we'd best get going."

But Marianne stayed rooted, wide-eyed. "Is this what the main caldera looks like, on a larger scale, of course?"

Akil shook his head. "Radiography shows it's full of debris. No light in there, anyway."

"Okay. Ready to go."

Ten more minutes of bounding uphill brought them to an immense vertical trunk that Akil thought must be thirty meters across. It had two yellow-brick fruits hanging from a lower branch. A glance at the map displayed on his com patch showed them about ten kilometers out from the main caldera. So near, yet so far—but he was on another mission today. He prepared himself for a climb that would be long, hot, and tiring even in low gravity that had noticeably decreased as they ascended closer to the null-gee point between the worlds. But as they approached the tree, he heard a very low pitched moaning.

"Hear that?" Marianne asked. "This is one of the first trunks that actually goes all the way to the L1 point. It's also our elevator."

"Elevator?"

She grinned. "That's the surprise. It's hollow. See that opening? What you hear is a draft blowing into it. In the trunk, the flow rises about seven meters per second." Marianne smiled at him.

It was darker black on lighter, but Akil could make out a notch in the tree twice as big as a person.

Marianne stuck her staff on her backpack and approached the notch from the side. She grabbed a vine on the way and then moved in front of the notch, coveralls flapping in the first stiff breeze Akil had seen on Haze. She clearly needed to hold onto the vine to keep herself from being sucked in.

"Cool at last! Oh, this feels good! See you upstairs!" She let go and was gone.

Venturi effect, Akil thought. If the shaft velocity was seven meters per second, and the opening half the area of the shaft, the inlet air stream would be about fourteen meters per second. He thought for a moment. Terminal velocity, where wind resistance equaled weight, for a spread-out person falling on Earth, was around 48 meters/second. In 1/16 gravity, that was reduced by the square root to about 12 meters per second. Then the atmosphere was almost three times as dense; so a light breeze of 4 meters per second should be enough to support his weight here. So a seven-meter-per-second air stream should leave him with a net ascent rate of about three meters per second. Air density would trail off some with altitude, but here between the worlds, gravity would trail off even faster.

He followed Marianne's example and approached from the side, grabbed a vine, then moved into the air stream. He had to hold on hard, but the wind felt wonderful—cooling and drying him.

It was time to go. Still, to just let go and let himself be blown away worried him. What if he hit something? If he was going to hit the inside of the tree opposite the wall, he wanted to hit feet-first, so he grabbed the edges of the opening and lifted his feet.

The wind swung him up like a vertical hanging gate, and he let go when he was horizontal. He brushed some resilient foliage on the top of the notch a couple of times, and then he was floating up in the breeze. Turbulence near the sides of the tube pushed him back toward the center whenever he drifted away from it. He could barely sense his motion, but the spot of light below him grew steadily smaller. Then it vanished altogether. Eclipse.

"Marianne?" he said into his com patch, worrying about a collision in the dark. A comforting dim glow came from its screen, light enough for his dark-adapted eyes to see the insides of the hollow tree trunk as he drifted past them, if he didn't stare directly at the screen.

"I'm about a hundred meters above you," she replied.

Plenty of distance. "Just out of curiosity, how do we get off?" he asked.

Marianne laughed. "There's a net blocking the shaft at our stop—no worries; it's a dead one. Now I have some questions for you. Why is it so hot here? With the eclipses, the forest gets half as much light as the rest of this double planet!"

"Convection. This thick air and Oshatsh's redder spectrum means most of the incoming energy gets absorbed on the way down and distributed by air currents. Around the tree, the atmosphere is even deeper because the gravitational potential levels are further apart. That blocks more of the infrared radiation; so you get more greenhouse effect. Still, because of the eclipses and lower pressure, it averages about five kelvins cooler here than Haze's outer pole."

"Could have fooled me. Exercising too much, I guess. Okay, now tell me why Haze and Shadow even *have* an atmosphere. And why haven't Haze and Shadow merged?"

Very good questions, Akil thought; questions that formed much of the motivation for the expedition in the first place. There were plenty of models, all with a lot of free parameters and some good guesses, none of which was proven.

"We're still working on it; we've only been here for a few months, after all. I can tell you this much; because the atmosphere is so thick, water and any other hydrogen compounds tend to freeze out many kilometers below the mesosphere. So it's almost all dry nitrogen, oxygen, and helium above the stratosphere, and largely helium atoms with only a few nitrogen and oxygen molecules when you get to the top of the atmosphere where molecules might escape.

"That's the exobase, and its temperature is about 23 Celsius below freezing. To escape Haze and Shadow, atoms only need to move about 1900 meters per second, like on Earth's moon. But the thermal velocity of neutral nitrogen or oxygen atoms at that temperature averages less than four hundred meters per second, so they pretty much stay put.

"Ion pickup is another matter, but Oshatsh has a lot less ultraviolet than Sol and doesn't create a lot of ions. Nor does it have much solar wind, and what it does have is largely neutral. Still, there's a significant loss. But there are significant reservoirs of volatiles, too. Big oceans and large ammonia clathrate deposits at the bottom of those oceans, mainly along the orthomeridian."

"The what?"

"The great circle equidistant from the inner and outer poles; it's at right angles to the prime meridian and goes through the north, south, east, and west poles. The term was invented back in the twenty-second century by the geographers of tide-locked worlds."

Marianne sighed audibly. "Got it. So we think Haze and Shadow *are* losing their atmosphere, they just haven't had time to lose most of it."

"Yeah, more or less. Chandra thinks the time constant is something like five billion years. Sun-Oh used a different method and got three billion, but Oshatsh is easily eight billion years old, so there's something they don't understand going on here. That's why we do these things, I guess. Haze and Shadow combined still have about two and half times as much atmosphere, by mass, as Earth does, and must have started with a lot more."

"I see. Now," Marianne asked, "why haven't they crashed together?"

"We don't know. Tidal perturbations and friction should have done the job long ago. But there are a

couple of contrary influences; you notice how it's always cloudier on the trailing hemisphere?"

"Yeah, come to think of it."

"Well, the greater reflectance on that side provides a small net push in a spin-up direction. Also, the ongoing mass loss decreases the gravitational attraction. The geometry of the land gives a tidal slosh frequency that's out of phase with rotation, so that drag effect is tiny as well. Finally, the forest itself may pump-up the rotation like a Landis tether, by contracting slightly during eclipses and relaxing otherwise."

"The Gaia effect?"

Akil shook his head. "Thermal if anything. Anyway, the length of the day may actually be increasing, but we haven't been able to find ancient coastal tide lines because all the land surface is volcanic and generally younger than the hundred million years or so of data we'd need. There's essentially no fossil record."

"Tell me about it," Marianne said, a hint of exasperation in her voice. "We biologists have nothing to explain evolution here, either, or where the interforest came from. Those volcanoes look weird, don't they? Like big nipples. Why?"

Akil laughed. "That one I can explain. It's the sharply curved potential surfaces between the worlds. If you measure the mountain surface against the local mean potential surface, they have roughly the same slope as Olympus Mons, Mauna Loa, or any other shield volcano in the known universe. What low gravity gives in vertical scale, it takes back in a reduced coefficient of friction. Remember, it has to get down to zero in the center where their gravities cancel each other, about a hundred and sixty kilometers up. It's like the two planets were trying to suck each other's guts out.

"On the interforest, my guess is that the shield volcano on Shadow's inner pole once reached almost to the L1 point. Surface gravity would have been down to less than one percent of Earth's at the surface. Trees of ten or fifteen kilometers height would have been structurally feasible, and their tops could easily have hung over into Haze's gravity well and grown down to Haze."

"Well . . ." Marianne sounded unconvinced. "The problem with that is that the main interforest trunks are more closely related to the local vines than the tall trees of the perimeter. It might have started as air weed at the L1 point that hung lower and lower until it touched the ground. Before you tell me the L1 point isn't stable going in or out, we've thought of that. The updrafts from the inner poles are enough to keep things up there. A kind of Sargasso air sea formed between the inner poles. The wonder to me is that the forest survives the eruptions."

Akil formed a basket with his fingers. "It forms a kind of natural Hoytether—an interlocking tube of branches that can be cut in many places without weakening. The occasional lava flows burn away only a few trunks at a time, and there are centuries or millennia between eruptions at the same place; the forest regenerates faster than it gets cut. If Sharada really can communicate with the Forest People, they might be able to tell us something about the frequency and effects of past eruptions."

"Don't count on it." Marianne said. "They may be as smart as chimps in some areas, but overall, they've gotten nowhere in at least the last twenty to thirty million years. That's about all the further we can trace them so far."

"You really don't think much of what Sharada's doing, do you?"

"I don't know, of course. But it sometimes seems to me like she's found an excellent excuse to indulge in what most folks would call a perversion." She sighed. "Please don't tell her I said that. I could be wrong,

and I'd like to put things back together with her if and when this ever gets over."

"Back together?"

"We're lovers, Akil. Or were before the Forest People took over."

Marianne preferred women? Akil's thoughts about her skidded to a halt, and he felt almost relieved. This was dicey enough without such complications.

"Uh, sorry about the break-up. But it seems from out here that you might be better off."

"Maybe, but I sure don't feel that way. Akil, when it comes to sex, she has this uninhibited go-for-it attitude that *sends* me! Our own communication was so great we really didn't have to talk about it, we just stare in each others eyes that way and then, uh!, I'm gone! What she did to me was just so damn wonderful. I want it back. Got the picture?"

Why, Akil wondered, did people like to dump their private lives on him? He'd never thought of himself as a "father confessor" type, but people kept doing it. He hardly knew Marianne.

"I see," he said, struggling to think of anything else to say. He had cared deeply for Kita and certainly had found her lovemaking pleasant enough, but the intensity of feeling Marianne was describing was foreign to him and didn't sound very safe. More importantly, the relationship could complicate their efforts to persuade Sharada to return. What had Richards been thinking when he sent Marianne after her? Or was that why he, Akil, was along?

"Uh, maybe things will work out," he finally offered.

"Not bloody likely, is it?" Marianne said. "Well, we've arrived."

Akil saw a tiny spot of light far above him; eclipse must be over. In a minute the spot of light grew large enough that he could see Marianne lying in a net above him. He felt unsettled as his eyes contradicted his inner ears and told him he was falling onto the net and her. He missed her by inches but the net stretched and pinched them together. It was a chance contact, but he was feeling a little sorry for her about her apparent loss of Sharada's affection, and gave her what he intended to be just a brief and friendly hug.

She clung, and his heart started beating a little faster. They looked at each other seriously for a second, and he had to fight off a moment of instinctual desire. But she disengaged wordlessly and scrambled off the net and out through the hole.

What had happened there, he thought? She was apparently oriented toward other women and he really didn't like her that much anyway. So why?

"Akil! Come out, look at this!"

He scrambled out of the net to the hole in the tree and looked into an utterly alien environment. The vegetation was thinner up here, with shafts of light lancing through the huge spaces to illuminate a riot of color. Indescribable smells assaulted him.

The hole led onto a huge branch, almost as thick as the main trunk, that led to the next main trunk, perhaps three hundred meters away. He climbed out against an incoming air stream; the true exhaust of this hollow trunk must still be many kilometers above them. He looked around. Huge overlapping iridescent leaves—or were they flower petals?—grew in twin rows out of straight spikes that seemed to grow from the main trunks themselves. Outrageous red flowers that vaguely resembled Chinese lanterns ten meters across hung from impossibly thin vines that reached up to branches and vines overhead. They

were lined with Japanese-fan leaves black as midnight, translucently thin, and at least two meters in radius from the vine. His mouth opened wide; virtual training had done nothing to prepare him for this holistic experience. Occasional weird sounds made the unearthly silence all the more noticeable by contrast. In the distance, a tone-deaf idiot tried to tune a violin. Something hit a gong so huge and low-pitched that he felt the vibrations more than heard them. The call of a tortured cat punctured the relative peace in six-note clusters of tonal agony.

Huge, strange shapes flitted in the deeper murk, and the sight of familiar "spider nets" hanging between close vines and branches almost reassured him.

"Down here, Akil."

He scrambled to the edge of the "branch," clinging to its rough soft "bark," and looked down. He spotted Marianne's dark blue coveralls a hundred and fifty meters or so below him, against what looked like a platform woven of some light sticks. A sky-eel nest, he thought, remembering his orientation. Things would fall on it and the sky-eels would eat them, dead or alive. This one was clearly uninhabited for now. Marianne was holding a light yellow something.

"How . . . ?"

"Just jump! Jump *down*, right at me—otherwise it will take you forever to fall this far."

Intuition screamed *no* at him, but he realized she was right. Still, he couldn't make himself jump down very hard, and he seemed to float down like an oversized leaf in the giant wood. He protected his face with his arms just before hitting the platform and bounced up gently, forgetting to hang on.

Marianne grabbed him, pulled him down and showed the cloth to him. He recognized it immediately. "Human coveralls. Maybe Sharada wore them after all, at least this far."

"They're too small." Marianne shook her head and looked grim. "I think she has Olympia with her."

"Uma Weiss's daughter?" The implications of that took a moment to sink in. Suddenly, despite the heat, Akil shivered. "Did you tell base?"

"Yeah. Olympia's not there. Didn't leave word with her mother, either. She told one of the other children that they were going to talk to the 'caretaker,' whoever that is."

"I'd guess the 'caretaker' is one of the Forest People."

"And I think you'd be right. Uma is upset."

No doubt, Akil thought. "Are they sending help?" he asked. "There's no sign of anyone here, and talk about a needle in a haystack. . . ." He gestured around him. "I think it's time to forget about contaminating the Forest People with technology and fly some people and surveillance robots up."

Marianne looked frightened. "That's what I thought, but they don't agree. Not even Uma. They're worried about destroying the possibility of the Forest People developing as a non-technological culture; that's a real hot item in exosociology. So another low-tech climbing party is on the way, but they want us to start searching around here." She sighed. "I want a robot. I feel bloody damned expendable, right now."

Akil reached for his com patch, then thought better of it. This woman was far senior in ground experience, and if *her* advice wasn't being heeded, his would just be so much noise. He thought briefly about just sitting tight and waiting for reinforcements. Then he thought about the twelve-year-old. "Where

should we search?"