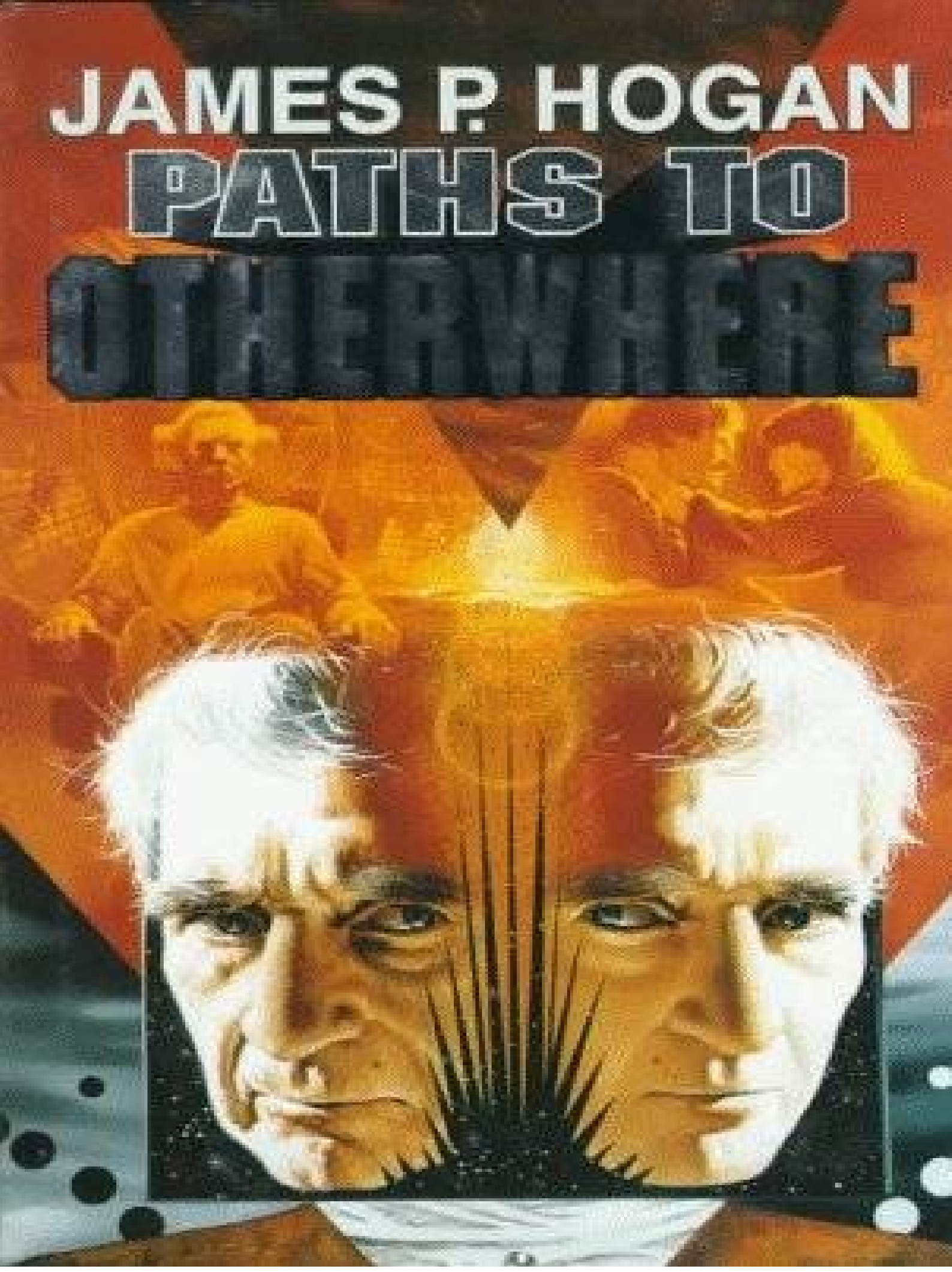
JAMES P. HOGAN

PATHS TO OTHERWHERE



Paths to Otherwhere

James P. Hogan

PATHS TO OTHERWHERE

A Baen Book

ISBN 0-671-87710-0

Cover by Gary Ruddell

First Printing, February 1996

These ePub and Mobi editions v1.0 by Dead^Man December, 2011
dmebooks at live dot ca
Highroller scan, reformatted

Prologue

The woman in the tan business suit sat in a padded recliner that looked like a dentist's chair. H head lay in a concave rest that kept it positioned exactly in the focal zone of the projection array a fe inches above. She was staring at one of the screens on a panel in front of her. Leonard Sarvin, Depu Director of the Defense Research Administration, stood to one side, out of the field being directed b the machine. His principal assistant, John Fiske, was with him. The department had poured millio into this, and the Director was being harried by the President's office for a progress update. Jes Willard, the National Laboratory's executive director, watched from the other side of the chair, whil the chief scientist of the project, who was handling the demonstration, checked other screens. Cabine and equipment racks lined the partitioned space around them. The hum of pumps and cooling fa came from other machinery beyond.

"It's quite straightforward." Kintner looked up and addressed the three visitors. "We're Black. Th machine plays Red. It's our move. But the bet has to be real. Let's make it ten dollars, say. You've go three choices for how the game will go: Win for Black, win for Red, or a draw. Winners divide th pot."

"What happens if we all lose?" Fiske asked.

Kintner smiled thinly. "Then I suppose thirty dollars goes to charity."

The two men from Washington looked at each other, as if checking for something they might hav missed. They both shrugged together.

Ten on Black," Sarvin said.

"Black," Fiske agreed. He looked at Kintner and Willard "I mean … what else is there to say?"

The screen showed a position in a checkers game. Red was down to four men, one of the blocked, the others positioned hopelessly. Black still had five men, plus another two already crowne No six-year-old could have lost from that position.

The woman in the chair continued staring with a puzzled expression, however. Her name was Jan She had only recently been promoted to Fiske's personal secretary, and the role of being the guine pig had fallen on her as the junior member of the party. Her eyes and common sense were telling h the same as the other two had said. And yet …

As she considered the three options in turn, draw seemed to shout insistently from somewhe deep in her mind. It made no sense; yet every instinct impelled her toward it. She bit her lip, uneasy the thought of appearing foolish. But Kintner's instructions had been quite clear: "Forget everythi you think you know. Just play your hunches."

"Ten on a draw," she said finally.

Beside her, Fiske laughed. "Okay. It's your money."

"Then let's see what happens," Willard said "Would somebody care to decide the move?"

Sarvin and Fiske looked at each other again. Fiske pointed at the screen. "How about that guy there? Move him up. Why take chances?"

"Looks good to me," Sarvin agreed.

"Very well," Willard said.

Kintner tapped at keys. The move appeared below the board, with a request to confirm. He hit th

y key.

And the board disappeared, to be replaced by the legend:

WHAT WE DIDN'T TELL YOU WAS THAT THE GAME SELF-DESTRUCTS AT THIS POINT

NOBODY WINS.

SORRY GUYS.

Willard's manner lost the flippancy that he had been maintaining. "It doesn't predict the actu future. That's impossible on principle. But what the machine can do is extract the probabilities possible alternatives from the weightings of the Multiverse branching structure ahead. And since it driven by real future outcomes, not theoretical models or probabilities, it delivers a correct indicatio even if the truth is not as you've been led to believe. Think what an impact this will have on strateg policymaking. It could enable us to restore the entire world balance."

Just at that moment, it was having an impact on other things too. Jane, still coupled into th machine, was getting vivid premonitions of where more in life was heading than just a checkers gam For months now she had been buying Jack's line about doors he could open for her in the departmen a marriage that was just a pretense … How could she have been so naive? Fancy dinners on h expense account, a few nights in hotels when they went on trips like this – and she'd thought she wa heading for the big-time social circuit and a career? *WRONG! WRONG! WRONG*! the machine wa telling her. Everything about that future felt bad. There was nothing specific that she could pinpoin just overwhelming forebodings of anger, hurt, shame, ridicule. But it felt as certain as the result of th checkers game had a few minutes earlier.

She sat up sharply, her eyes blazing at him. Fiske saw the change in her and shook his hea mystified. "Hey, what is it?

There was no way that she could control the indignation boiling up inside. At the same time, in a official visit and with others present, the moment was not appropriate for confrontation.

She got up. "We have to talk – later," she said tightly.

Then, to the others, "I'm sorry. Will you excuse me, please?' And with that, she walked quickl from the scene.

Sarvin frowned Fiske looked appealingly at the scientists. "I'm sorry … I really don't know wh that was all about." He made a helpless gesture, as if trusting them to understand.

"It's nobody's fault," Kintner said. "The process does have deeper side-effects. We're sti learning about them ourselves."

They were getting reports of strange happenings from a number of places where research wa being conducted. The world didn't need this loose in it as well, on top of everything else, he to himself.

"It's too potent to be left out there for any foreign power to harness and exploit," Kintner to Willard later, when they were alone in Willard's office. "The whole thing has to be brought unde official direction. All other projects should be terminated. Get the best people in the field here and p everything under one centralized authority, where it can be controlled."

"I already talked to Sarvin about it," Willard said. "He's making the same recommendatio We're trying to schedule a meeting in Washington with the Security Council about it for next week."

Chapter One

Sometimes Hugh Brenner thought he'd been born on the wrong planet. It seemed as obvious anything could be that people achieved more when they learned to get along than they did when the fought over things. If they put as much time and energy into fixing problems instead of blaming eac other for being the problem, there wouldn't be any problems left. So far they'd had two full-dre rehearsals for wiping out what passed as civilization. This time it looked as if things might be leadi up to the real performance.

He looked from the car along a rubble-strewn side street while they waited for the lights to chan on the two-mile-long slum of University Avenue leading to the campus. An orator in a forage-styl cap and gray-shirted uniform was pounding the air and shouting into a microphone from a raise stand. Below, a line of linebacker-size Grayshirts stood facing a crowd of a couple of hundred, main students and local derelicts. A banner above the stand read: NATIONALIST ACTION COALITION Youths in parkas and leather jackets were gathered farther along the block. Around the corner, polic in riot gear stood behind armored vans with mesh-covered windows.

"Looks like more trouble today," Chris said from the passenger seat. Hugh's route into Berkele brought him past the pile of one-room rental conversions that Chris shared with nine other student Not many sophomores drove these days. As part of the measures to prevent Detroit from closing dow altogether, regulations and taxes were designed to clear older cars off the roads. The light turned gree below the cluster surveillance cameras covering the intersection. Hugh sighed and shook his head he eased the car forward. It was a GM Ocelot that he'd bought used and well worn, built south of th border.

Behind them, Alice turned to peer through the rear window. She had started appearing with Chr two or three mornings a week, almost a month ago now. Hugh didn't know much more about her tha that she could have looked better if she had a good meal more often; she came from San Antonio; an she was majoring in political sociology, whatever that was. Hugh didn't have much time for politic A physicist of twenty-eight, unattached, with no dependents, no dependencies, no payments, he wa one of those oddities who still thought life could be simple and honest.

"At least they've got plans for *doing* something," Alice said, turning back.

"It's all a mess and too far gone," Hugh answered. "What's anyone going to do now?"

"Well, somebody has to. How else are we going to get things back on track?"

Hugh knew the line: *Security is Strength. Pride through Duty. Honor and Sacrifice*. Liberals an speculators were the cause of all the problems. Chris had been sounding more radical lately. Hugh ha wondered where he'd been getting it from. He wasn't in a mood to be indoctrinated just now. "Chr says you want to come over to the lab and see our machine, Alice," he said to change the subject.

"The QUIC," Chris said, turning his head to look back.

"You mean so you can show me how smart scientists are?" Alice replied.

Chris shrugged indifferently. "You don't have to. I just thought you might want to see somethin different. If you'd rather stick to another day of same-as-usual, that's okay by me."

"As if we didn't see enough machines everywhere all the time. They're always going wrong, an they make life too complicated."

"I told you, this one's different."

Hugh could sense Alice searching for a put-down to come back with. He didn't understand the fa that made younger people try to act so hard all the time. Perhaps it was part of an affected worldline that fashion demanded. Maybe it just reflected the insecurities of the times. Eventually she settled f a grudging, "It's something to do with communicating with other universes, right?"

Twenty years before, she wouldn't have believed it. But there had been enough in the news and th popular science media to make it fairly common knowledge that the "parallel universes" conjecture by theoreticians for a long time were now generally accepted as fact.

"Not communicating, exactly," Hugh said. "It extracts information from them – information th you can use."

"Such as for what?" Alice asked.

"When you decide to come over, you'll see," Chris told her.

"Why not make it right now, when we get in?" Hugh suggested.

There was a pause. Neither of them, it seemed, could find anything wrong with it. "Okay," Alic conceded finally. "Why not?"

"There you go: easy," Hugh said. "Why is just keeping things simple so much of a problem thes days? I don't understand it."

They turned left at the end of University to make the circuit around to the east side of the campu Coils of razor wire lined the top of the wall to the right. The street-facing windows of the universi buildings were protected with screens. A lot of disgruntled people thought that all students wer privileged rich kids. The gates had barriers with armed guards, like military checkpoints.

One thing, at least, to be said for the slump was that it made parking easier. Hugh found a plac near the East Gate, opposite Stanley Hall. As they got out, a man in a soiled reefer jacket came ov and scowled. He was big, with a blue chin, flattened nose, and stained teeth. He slammed the wing the Ocelot with the flat of a hand that looked as if it could as easily have punched through. "Mexica garbage! Waddya wanna buy this crap for? You ashamed of bein' American or sump'n, huh?"

Hugh looked him in the face, candid and wide-eyed. "My mother left it to me … It was only month ago."

"Oh … yeah." The gorilla faltered. "Then I guess that's different. Okay, I didn't know, okay?"

"It's okay."

Hugh shrugged and showed his palms in response to Chris's pained look as they turned from th car. He didn't see it as taking work away from American auto workers. Hell, most of them were i Mexico, anyway.

Inside the Biophysics Department, they entered the lab from a corridor of plain yellow walls line by doors on both sides. A technician in shirtsleeves and jeans was working at an opened electronic cabinet, one of several clustered in the center of the room. On the far side, a girl operating a des terminal waved a hand without looking away from the screen. Chris went into an inner office to chec the morning's E-mail. Alice stood looking around while Hugh hung his windbreaker on a peg behin the door.

It was the typical jumble of untidy desks, wire-entangled cubicles, and half-filled equipment rac that electronics researchers everywhere seemed to revel in. Charts and notice boards filled the wal between shelves sagging with books and binders. A bench running along one side carried a collectio

of oscilloscopes and other test gear, soldering irons and tools, and unidentifiable gadgets in variou stages of assembly or dismemberment.

"Do you know what quantum paradoxes are?" Hugh asked as he came over and began enterin initialization commands into the touch panel of an improvised console.

Most people at college would know enough to be familiar with the gist.

"Something to do with things being waves and particles at the same time, isn't it?" she said.

Hugh nodded. "Things like photons and electrons, that people usually think of as particles, ca also interfere with each other like waves." He made throwing motions in the air with both hands. "Yo know when you toss a couple of stones into a pond – each one makes circles of waves that spread ou Where the circles start to overlap, you get a criss-cross effect of flat spots and rough spots. That called an interference pattern."

"Okay … And quantum whatevers do the same thing?"

"Right. Except there's a difference: They can do it with themselves – apparently. It's as if yo only threw one stone, but you still get the pattern."

Alice thought about it, made a face, and shook her head. "That doesn't make sense."

"Which is why they used to be called paradoxes. But the answer turns out to be that what th particle – or whatever – is interacting with isn't itself, inexplicably, in *the* universe, but counterpar of itself, or 'ghosts,' if you like, in these other universes that you read about. In fact, that was wh persuaded most physicists to accept them as real: the way they explain the paradoxes."

Chris reappeared in the doorway from the office. "Just routine stuff, mainly," he told Hug "You've got a note to meet Theo in Strahan's office at eleven sharp." Theo Jantowitz was th professor that Hugh worked with – Chris was one of their technical assistants. Stan Strahan ran th department.

"Probably to do with these government people who are supposed to be coming today," Hugh said

"What do they want?" Chris asked.

"You tell me. Nosing around the project, I guess."

Alice looked puzzled. "I thought that you guys were working on something to do with evolutio What does the government care about giraffes' necks or where chickens and eggs come from?"

"Tell me something that the government doesn't care about," Chris snorted.

"It started out as something to do with evolution, but it's kind of taken on a life of its own," Hug said. "We'll find out soon enough what they want. Anyway …" He indicated one of the regular, five foot-high cabinets. Its side panels had been left off for easy access, revealing several racks electronics filling the lower part. The top section consisted of a metal frame holding three tiers aluminum boxes, each about the size of a paperback book, arranged in rows. Another cubicle stoo behind, and a confusion of pipes, metal coils, and valves connected to a cooling system stacked by th wall. "That's it. Meet the Quantum Interference Correlator. QUIC, this is Alice."

He waited while her eyes darted uncertainly, seeking a hint for a hopefully sensible question ask. She didn't make a joke by talking to it. Too intense. The ones who were into politics were alway too intense.

"Okay, so these other universes are real," she said at last. "This machine here – you're saying th it connects to them somehow?"

“Kind of. Interference between universes at the quantum level means that information transf takes place between them.” Hugh patted the top bank of silver boxes. “The guts of it all is in thes They contain a special kind of circuit chip with precisely configured helical structures integrated in the electronics. Think of them as molecular-scale antennas. They tune to the quantum-lev information leakage and couple to their other-universe counterparts, just like the ‘ghost’ particles.”

“Oka – ay …”

Hugh tapped one of the boxes again. “So this machine is actually a lot bigger than what you see. operates in combination with thousands of copies of itself, that exist in other universes.”

Chris stood by them, watching the befuddled look spread across Alice’s face and enjoying it. Sh shook her head. “This is getting weird. I mean … So what does it do?”

Hugh rolled a chair up to the console. “Well, let’s have a look and see. You can be driver.” Alic sat down and waited while he tapped in a line of text. When he had finished, the words on the screen front of her read:

This is a test sentence to show what the QUIC can do.

He indicated it with a nod. “Now you just copy what I’ve typed there again, underneath. But I wa you to make an error in it somewhere.” As she was about to begin, Hugh said, “Remember, there ar thousands of other Alices at thousands of other machines in thousands of other universes, all doing th same thing.”

She hesitated, eying him suspiciously. “You’re sure this isn’t some kind of joke?”

“Just go ahead and do it,” Chris said behind her.

“Make a mistake somewhere, right? Anywhere I like.”

Hugh nodded. Alice started copying the line. The timing of the characters did not synchronize wi her keystrokes – they appeared after varying delays of fractions of a second. She either failed to noti or didn’t mention it. When she got to the word *sentence* she typed, *s-e-n-t-e-m-c-e*. … But on th screen, the word appeared correctly. She blinked and glanced up at the other two. They said nothin She finished typing.

“It’s a con,” she accused. “The copy is automatic. What I do doesn’t make any difference.”

“That’s what you’d think,” Hugh agreed. “But in fact what’s going on is a lot more interestin See, the machine doesn’t only respond to what *you* type. It combines it with what all the other Alic are typing too. They all put in an error somewhere as well, but they didn’t all pick the same plac Statistically, the odds of any given place being picked are low. So, the letter that you picked got type right far more often than it got typed wrong, and the machine went by the majority vote. And the sam was true for every other choice too. So all the Alices got a correct sentence, and they’re probably a staring pretty much the way that you’re staring at me right now.”

“A self-correcting keyboard,” Chris said. “Like it?”

The tech who had been working on the cabinet was watching. “Neat, eh?” he said to Alice.

She slumped back in the chair. Finally her defenses were down. “This isn’t real,” she muttered.

“Oh, it’s real,” Hugh assured her.

She found that she could make the cursor trace an almost perfect circle on the screen – because th random wobbles made among the Alices in the many universes tended to cancel each other out.

Or, instead of combining the results from all universes together, the machine could simply deliv the first response from any of them. In simple problems like matching shapes and finding names on street map, in all but one try out of twenty, the machine had the solution before she did. It meant th another Alice somewhere had found it faster.

Chris had moved away to talk to the tech working on the cabinet. Alice looked up at Hugh. He ha smooth, tanned features with high cheeks and deep, distant brown eyes, the legacy of a dash Cherokee somewhere back in the gene line. His hair was black and wavy, collar length; his face wa fringed by a wisp of beard and another across his upper lip, forming a humorous excuse for mustache. Her calculating eyes regarded him curiously. The line of the mouth softened a fraction. H saw that expression two or three times a week. The offer was there: frank, unashamed opportunistic – ready to trade in the sophomore for a lean, laid-back, not-bad-looking postdoc. Mobi too.

No, he liked life simple, he told himself. And it was already complicated enough. Don't even thin about it. Besides, cutting Chris out like that wouldn't have been his style.

"Alice," he said, lowering his voice, "there are problems that I don't need." He gave her an eas smile and shook his head. "Even with thousands of me out there to think about them."

It could be tempting, though. For a moment the thought came into his head of asking her if she ha a friend who wasn't attached right now. Then, after a second or two, he dismissed it. He wondered he did so how many of the other Hughs in the other universes had made the same decision.

Chapter Two

Allegedly the two visitors were scientists, not bureaucrats – although Jantowitz maintained th once Government got into science it made little difference. Stan Strahan, the head of Biophysic brought them down to the lab after lunching with the faculty dean. He didn't say where they were fro or what the reason was for their interest in the work at Berkeley.

The first, Strahan introduced as Dr. Kintner. He was a biggish man in his mid-to-late fifti Although his belt had probably inched out a notch or two in the last fifteen years, he was trim enou for his age and still hefty around the shoulders. He had a smooth, expressive face with a high forehe accentuated by receding hair, and wore gold-framed bifocals, a charcoal-stripe suit, and subdu maroon necktie. Hugh thought he smiled too much, with a geniality that became condescending. H distrusted smiling people from the government. There was always the possibility that they might h here to help him.

Kintners companion's name was Ducaine, again a doctor. He was in his mid thirties, with a heav rounded jaw, protruding eyes that stared intently, and a florid complexion, which with a halo crinkly, overgrown, yellow hair, gave him a wild look. He was wearing a tweed jacket with knitted ti From the moment that Strahan showed them into the lab, Ducaine's gaze darted ceaselessly this wa and that over the equipment. Hugh was unable to tell whether it signified complete cluelessness or a expert's sure and silent assessment.

Strahan pointed out the component parts of the QUIC,. which they had evidently talked about ov lunch. Ducaine stooped to peer at the antenna-boxes in the top frame of the main cabinet, th transferred his attention to an uncased module that Strahan offered as a sample. "What discriminati method do you use on the coupling from the antenna chips?" Ducaine inquired. Strahan nodded Hugh to take it.

"You mean for directionality resolution?" Hugh said.

Ducaine's yellow halo bobbed vigorously. "Yes. Multiphase arrays? Masked sequential? Grou extraction filtering?"

"Multiple phased arrays," Hugh said.

"Your own design?"

"Mainly – although the basic idea was published a few years ago. We added a filter stage th performs partial extractions as a second stage."

"Snell's Algorithm?"

"A variation of it, yes."

"Hm. Interesting." Ducaine turned the assembly over to inspect the other side. Definitely n bureaucrats, Hugh told himself – and not amateurs when it came to the science, either.

"And yet the project originated from work concerning evolution," Kintner said, directing himse at Jantowitz to bring the professor more into the conversation. "It must have taken a remarkab insight to connect Multiverse cross-communication with evolutionary dynamics. What prompted it?"

Strahan had explained over lunch that it had been generally conceded for some time that th theory was in trouble. While few seriously doubted that evolution happened, it had becom increasingly clear that the mechanism traditionally upheld as the driving force – natural selection,

the progressive accumulation of random mutations – did not possess the innovative power to expla what was observed.

Jantowitz had developed a hypothesis that the geometric configuration of DNA could cause it function as an antenna. He was a theoretician. Circuits and chips were not his line, which was why had teamed up with somebody like Hugh. Hugh's thesis had been to test the idea by attempting build an artificial device to do the same thing.

Jantowitz regarded the visitors balefully through heavy, horn-rimmed glasses. He never allowe himself to be enticed into returning smiles. "The evidence that Darwin predicted would be everywhe found for the gradual changes that he proposed – found, it has not been. The intermediate forms do n exist." He didn't like officialdom in any form. But he evaded rather than confronted. His way putting off people who irritated him was to provide answers that had no connection with the questio asked.

Jantowitz was in his early sixties, getting somewhat corpulent now, with a snub nose and thick li that thrust forward to give him an appearance of gazing disapprovingly on everything that scrutinized – which was often the case. He had a head of white but full, wavy hair, and a matchi droopy mustache. But for his clothes, he might have looked quite distinguished. They gave t impression of having been thrown at him and somehow stuck, rather than put on, and clashed colo and styles with a determined consistency that Hugh thought was surely genetic in origin. Today he w wearing a tan lab coat unbuttoned to reveal a red-and-blue check hunting shirt and the collar of hand-knitted gray cardigan that he had owned for as long as Hugh had worked with him, and whi Hugh sometimes suspected he'd been born in.

Ducaine tried to pick up the gist of what Jantowitz was saying. "You couldn't have bursts of rap evolutionary change instead, separated by long periods of stability? Wouldn't that explain the absen of intermediate forms?"

"Waves and weather, the superficial aspects of geography, they might shape," Jantowitz said. "Bu to build mountains and move continents, you must have deeper forces." The visitors looked at Straha for enlightenment.

"Explanations along those lines were tried, but they didn't really work," he said. "Every cell is miniature factory containing millions of specialized parts, all interdependent. On every level up to complete organism, too many unlikely changes would have to take place at the same time to transfor one viable form into another. It would be like mixing parts from an auto engine and a washi machine. The inbetween forms wouldn't be functional."

"It sounds as if you're saying that evolution can't happen at all," Kintner remarked.

"Not in the time that the evidence points to," Strahan agreed. "Even with the most generou allowances that you can plausibly make, all the calculations said that what had happened couldn have."

"So how are we here?"

"If the Earth were a few million times older, then, maybe, something like the orthodox mechanis might have been adequate," Strahan said. He waved a hand. "But not as things are. Something mo had to be going on."

"And your suggestion was quantum-level communication arising from the DNA structure tuni to leakage frequencies," Ducaine said, looking at Jantowitz.

They went on to talk in a little more detail about the origins of the QUIC. The basic idea had bee that the same interference that made particles appear to interact with themselves, and which ha linked the machines being operated by the juxtaposition of Alices, also enabled certain biologic molecules in different universes – specifically, the nucleic acids and their evolutionary predecessors to communicate naturally. The information accumulated in the genomes of the species making up th Earth's biosphere was not a product of the evolution taking place on just one Earth, but from a hug ensemble of Earths exchanging results. Hence, there was no need for the computer to have bee running for millions of times longer to have produced the super-computation that had resulted. consisted of countless "regular" computers cooperating in parallel.

Whether or not the model was correct had never been established. The work had been complete sidetracked into developing the hardware, and the QUIC was the outcome of it.

When the talk reached this point, it became clear that it was not curiosity about evolution that ha brought Kintner and Ducaine to Berkeley. Their questions had been for form's sake. What they reall wanted to hear about was the QUIC hardware and its underlying multiple-universe physics. It turne out that they were fully conversant with Hugh and Jantowitz's published papers. They showed gre interest in the theoretical basics that Hugh had employed in his designs and asked for copies of h calculations and schematics. And then they departed, still without giving any hint of where they ha come from or why, leaving the campus after a final session alone with Strahan in his office upstairs.

"Okay, Stan, would you mind telling us what all that was about?" Hugh invited when he an Jantowitz made their way up to Strahan's office a quarter of an hour after Kintner and Ducaine ha gone. "Those two were not dummies from some PR office putting together a career guide for th schools. They're right out on the edge of this business. What does the government want with QUIC?"

Strahan had been expecting it and had prepared a line to stall things until he heard definite wo from the Board. But after putting up with two hours of what had amounted to cross-examination, Hug was in no mood for stalling. Beside him, Jantowitz simply stood with his lower lip thrust out in a wa that dared Strahan to try it. Strahan capitulated with a sigh. He sank back in his chair and showed h palms in a conciliatory gesture.

"Okay, I'll be straight. It isn't the QUIC per se that they're worried about. It's the whole field o MV physics.

Apparently it has defense implications. The federal government have got their own thing goin and they want to classify all allied work."

"*Classify it*?" Hugh exploded. "Evolution? What the hell kind of defense implication is there that?"

"Oh, come on, Hugh," Strahan said tiredly. "You know it isn't that. It's the physics. They'r concerned with how the QUIC works. And in any case, don't try that one on me. You know as well as do that the QUIC hasn't had much to do with evolution for a long time now."

"Why do they want to put it under wraps? What kind of work are they doing?"

"I really didn't ask."

Jantowitz brought them both back from a line that was leading nowhere. "What is it, then, you a telling us?" he said. "Are they wishing to take control over our project, these governments peoples?"

Strahan massaged his temples for a moment, then looked up. "Oh hell, I really didn't want this be so soon … It's worse than that. They're closing it down."

Hugh stared disbelievingly. “You’re not serious.”

“I wish I weren’t. They’re serious all right.”

“But … it’s *ours*! We created it. It’s opening up a whole new world …”

“I think that may be the problem,” Strahan said. “It’s opening up more of a new world than yo think.”

“What are you talking about?”

“Let’s just say I get the feeling that they’re a bit farther ahead than they’re letting on. This wo leads into areas that they don’t want everybody in the world picking up on.”

“like what?”

“Would you believe they didn’t tell me?”

Hugh shook his head protestingly. He didn’t expect answers, but now it was he who needed to sta while he pulled his thoughts back together. “You can’t let them,” was all he could muster finally.

“Hugh, it’s out of our hands.”

Hugh’s color deepened, and his breathing became short. Jantowitz knew that for most of the tim he tended to be fairly easygoing. His ability to escape totally into his work kept him detached from th worst of life’s stresses and tribulations. But on the occasions when he did lose his cool, it could b spectacular. Now everything that he had worked for in years was about to be snatched away, an Jantowitz saw one of those occasions about to happen. He caught Hugh’s sleeve and tugged lightly.

“Come, Hugh,” he urged. “Time it is now for us to get some coffee, I think. Cooler heads make th better sense, yes? Maybe we come back tomorrow and talk with Stan some more, when we hav together our questions thought out.”

Hugh drew back, exhaling a long breath. He nodded. “I guess you’re right.”

“I’m really sorry about it, guys. Believe me,” Strahan said.

They left the building and went to the snack restaurant situated on-campus. By the time they s down, Hugh had lapsed into brooding restlessness. Jantowitz did little to lift him out of it.

“The protesting will do you no good. It just makes ulcers faster,” he said. “These situations, I hav seen before. Everybody fights for the same moneys from the government’s pig-trough. And on top o this, you have all the administrators and faculty heads who think they make good politicians, carin more about being somebody at Washington cocktail parties more than they care about science. No on will be on your side.”

“What are you saying, then?” Hugh asked him. “We just let them wrap it up and walk awa without even trying to fight them?”

“I’m simply saying that perhaps the time has come to be a little philosophical. We have nothing t fight them with,” Jantowitz replied.

But then events took an unforeseen turn. People from an undisclosed department in Washingto appeared at Berkeley a week later and quizzed Hugh and Jantowitz separately on their backgroun and experience. Soon after that, Kintner came to California again with another colleague, calle Mulgrave, to talk to them some more, this time in the federal offices across the Bay in downtown Sa Francisco. It turned out that Hugh and Jantowitz’s work didn’t have to be wasted after all. All work o the new physics, they were told, was being concentrated under government direction. Subject

satisfactory background checks for the necessary security clearances, they were offered positions o the official program.

All they knew about it at that stage was that it was run by the Defense Research Administratio and would involve moving from California. But really, there was little choice. As Jantowitz ha prophesied, no serious internal opposition materialized to terminating the Berkeley project. Hugh work was his passion, while Jantowitz, at his age, had no other future.

The offers were subsequently confirmed.

And accepted.

Chapter Three

The trouble with the machine was that it gave anyone who coupled into it, and who allowed the mind to dwell upon the matter, a pretty good idea of what, generally, could be believed about th official pronouncements that they were supposed to live with. Since the environment was a politic one, with misinformation and doubletalk having been the accepted management style for years, th meant that nobody trusted anyone or believed anything that the machine associated with negativ feelings. Least of all did the powers in charge have any trust in the loyalty of their employees. But th world situation was critical and getting worse, and this research could provide the means for reversin it. The work had to go on. Consequently, security assumed a more crucial importance than was usu even for a classified program. The project's Security Officer, who reported directly to Willard, th Laboratory's overall director, figured prominently in all decision making. His name was Bruce Calom

"I still have reservations about this Dr. Brenner from Berkeley," he said, bringing a photo an evaluation summary up on the conference room screen. "Several of the staff members at Berkele considered him irresponsible because he talks too freely with students about inter-departmental affai that are not generally considered to be undergraduates' business. His reply is that enabling your people to practice making competent judgments is what universities are supposed to be for. To me th spells risky."

The meeting was to review the new names recently confirmed as recruited to the project. Wi Calom were Jesse Willard, executive director, and Edward Kintner, Chief Scientist of the Octago Project.

"I see you've added a personal endorsement, Ed," Willard commented, looking at the requisitio file.

"We need his expertise," Kintner replied simply. "The work that he's done there is brillian Neville Ducaine went over those designs of his and says they're as advanced conceptually as anythin we're using here."

"I still want it on record that I don't like it," Calom said.

"Do you have something specific?" Kintner asked.

"Just a gut-feel that comes after years of experience. I don't need any machine to tell me." Calo had said the same thing before the offer was made, but the scientists' arguments had prevailed. H knew that Kintner used the machine to guide his decisions, which no doubt meant that Kintner didn trust half the things that Calom said. He himself had an antipathy toward intellectuals, and scientis in particular – which didn't help matters.

Kintner regarded him equably through his gold-rimmed bifocals. "If everybody at th establishment could be guaranteed to come risk-free, you wouldn't have a job, Bruce," he said. "I' sure we can control the problematical aspects. In fact, if he possesses precisely the kind of specialize knowledge that we don't want being spread around, this might be the best place to keep an eye on hin We can put him under special surveillance."

Willard nodded at Calom. "Do it, effective from his date of arrival. Get an extended backgroun check on him too."

Kintner had known Calom's attitude, of course. But Kintner's enhanced premonitions had bee different. Evidently, what had sounded warning bells for Calom wasn't necessarily bad news fo

everyone else. When Kintner had coupled into the machine and contemplated future prospects, he ha been gripped by a sense of breathtaking possibilities that had excited the scientist part of him. Th certainty impressed itself that there could be new discoveries far beyond anything glimpsed so far. B only in association with the option of hiring Brenner. It vanished for every alternative. The machin could not be specific beyond that. So Kintner had lodged his vote, and the others could reconci themselves in whatever way they chose.

Willard looked down at his file again. “Very well, then, we need his expertise. And this Polis mathematician who’s coming with him – nothing further to report there?”

Calom shook his head. “Nobody’s got much on him either way. He and Brenner have worke together at Berkeley for four years now. His professional and academic record is solid. Apart fro that, he seems to have discovered how to stay invisible to most of the system. We’ll put him und observation with Brenner.”

The offer to Jantowitz had been on Kintner’s recommendation too. The man’s theoretic knowledge was impressive. And why not somebody with experience in biophysics? They already ha people from just about every other discipline on board. The project was a long way past being ju research into the strange side of basic physics, as it had begun. Now there didn’t seem to be an area human thought, action, or humanity’s very existence that didn’t stand to be affected.

Chapter Four

Hugh and Jantowitz received letters confirming that they would be joining an as-yet undesignate project located in New Mexico. Enclosed were plane tickets to Albuquerque/Santa Fe. For a mailin address, they were given a Post Office box number in Los Alamos. Their instructions were to report the Assistant Chief Personnel Officer in the Administration Building at the TA-3 site of the Lo Alamos National Laboratory. Temporary accommodation had been arranged for them in the town.

A young, tight-jawed Army captain called Hemel met them at the airport. There were also thre other arrivals for the" National Laboratory – two men and a woman, all traveling singly. They sa little as Hemel and a guard in fatigue dress, carrying an automatic rifle, escorted them from t arrivals concourse.

The airport had a wartime feel about it, with the National Guard patrolling the terminal buildi and armored cars on standby outside. Northern New Mexico was not a safe area these days. Urba terrorists driven out of the ghettos by police countermeasures and gang rivalries competed with bac to-the-wild survivalists for territories and spoils. Isolated residences were being abandoned, and son outlying communities lived virtually under siege.

Outside, a green minibus was waiting, with DEFENSE RESEARCH ADMINISTRATION painte on its sides. In addition to the driver, there was a second guard, occupying a rear-facing seat at t back. Before the bus moved out, Hemel called somewhere by radio and received confirmation that t road was clear. They left the urban area on Highway 25 toward Santa Fe, following the wide, fl valley of the Rio Grande. The crumbling red peaks of the Sandia Range stood jagged through the he haze to the right. Hugh's main impressions, fresh from the crush and commotion of the Bay Are were of the vastness, the emptiness, and the dryness.

Jantowitz, sitting opposite, had maintained his usual taciturnity through most of the trip. H always seemed to dress for winter in Illinois, and had on a mangled black homburg and tan rainco that he wore with the belt tied behind to avoid the bother of fastening it. A helicopter that ha appeared several times passed overhead again. The noise stirred Jantowitz out of whatever though had been preoccupying him. He turned from the window and gestured. "Not much city life here. I to you you should see more there when you could. Young peoples need the chance to make the mistake to learn from."

"Oh, I saw all the life I needed," Hugh answered. "Anyway, it'll be healthier here. High-dese climate. Good air. People probably get out a lot."

"Do you still do the jogging and that kind of thing?" Jantowitz asked the question warily, as if h were inviting a confession.

"Sure. It's supposed to make you live longer."

Jantowitz wrinkled his nose. "To me, it has always seemed that the things people do to live long would give them the least reason for wanting to. Too much health is bad for you, I suspect. Is lik money. Too much, then you start the worry that now you lose it, and the worry makes you sick."

"That's a new one, Theo. I'm not sure what a doctor would say about it, though."

Pah! Doctors. What do they know? Just body-mechanics."

Jantowitz looked back at the window and told the desert, "Four doctors who tell me to liv healthier, I have buried."

Hugh looked around the bus casually. The two men were talking earnestly in lowered voices ne the front. The woman was sitting in a closer seat, reading a typewritten document on a briefca resting on her knee. Thirtyish, Hugh judged; could be quite attractive if she dressed a little mo femininely and didn't look so intense. She sensed him watching her and looked across.

"Hi," he volunteered. She regarded him blankly, as if he had said something in an obscure diale of Swahili. The moment dragged like a joke fallen flat at a royal table. "Er, I guess we're bo working at the same place. We just got in from California. I'm Hugh."

Her eyes remained expressionless. "To save us both a lot of time, if you're wondering if I scre the answer's no," she informed him. "And in any case, I don't like being picked up on buses." Wi that, she returned to her reading.

"Well, excuse me …" Hugh looked back out at the distant side of the valley. Scratch one off th list, he told himself.

At Santa Fe they exited the highway and turned north amid dun-colored, adobe-style houses sprea out among sandy hills spattered with juniper, pinion, and desert pine. On the climb up to Los Alamo the landscape became bleaker and rockier. Deep canyons gouged their way between long fingers flat-topped mesa. Ahead to the west, the hills rose toward the greater summits of the Jeme Mountains, purple and hazy in the distance.

Los Alamos, extending ribbonlike along the top of a mesa, appeared suddenly as the bus cam over a rise after a winding, uphill section of road. It was young as towns go, most of it dating fro within the last half century. There were still some buildings going back to the "secret city" of th Manhattan Project in the early 1940s, but most had been replaced in the growth by a regular, ope community that had accompanied the founding and expansion of the National Laboratory in th postwar years. Then, in more recent times, the civilian programs had been gradually axed or hived o to other departments, and the remainder consolidated under the DRA to concentrate on defense-relate work. Much of the openness was lost; fences and guard posts appeared around places that had bee accessible; in many ways the area had reacquired something of its former character.

The bus passed the airstrip on the approach into the town, and then traversed the central are where the World War Two research had been concentrated. Then they followed the extension eastwar into more residential surroundings and turned off to the right. Captain Hemel looked back from h seat by the driver. "This is 43rd Street now. That's where you two will be staying until you g something more permanent. It's a private boardinghouse, run by a Mrs. Ryecroft. We know her wel She puts up a lot of people from the Lab."

They stopped outside an older two-story house, probably going back to the fifties, sheltering fro the world and time behind a barricade of laurel and a wicket fence choked with roses. It had bee repainted fairly recently, pale yellow with white sills and trim, in a brave attempt to relieve the dus torpor of the street. The drapes in the windows looked clean but old. A fading Old Glory, discolore by the sun, was painted on the mailbox.

"Try a little sugar with the acid and razor blades for breakfast next time," Hugh said to the woma with the briefcase as they climbed out.

While Hemel led the way up the porch steps and rang the doorbell, the driver unloaded the bag Somewhere inside the house, a dog began yapping. It started off another dog with a deeper ba somewhere across the street. Jantowitz's mouth tightened. Hugh shrugged resignedly. All his life, seemed, he'd been plagued by yappy dogs.

There was bustling behind the door, and a female baritone voice yelled, “Shut up, Selby! It okay.” Then the door opened, and Mrs. Ryecroft appeared. “Ahah! You have to be the professor an the doctor. I get professors and doctors all the time. Sometimes I think I could start my own universi here.” She didn’t lower the volume. Her accent was from New England, maybe near Boston.

She was heavy around the middle, with a large nose, wide mouth, and features that had once bee firm now rounding out above the beginnings of a second chin. A white top retained large, saggin breasts, while her lower half was squeezed into pink stretch-slacks that, with her weight, the indecenc laws should have had something to say about. In addition, she wore a purple head scarf knotted at th front.

Hemel introduced everybody and produced a document for her to sign. It made Hugh feel like package being delivered. Hemel reminded Hugh and Jantowitz that they would be collected at 9:00 th next morning, and then returned to the bus. The driver deposited the last of the bags in the fro hallway and followed. Mrs. Ryecroft closed the door. A terrier with hair that looked impenetrabl falling over its eyes had singled out Jantowitz for a confrontation and was emitting curiou whirringlike noises, presumably supposed to be snarls.

“Don’t worry about her,” Mrs. Ryecroft foghorned “She’ll quieten down when she gets used t you. She’s a Yorkshire, so I call her Selby. Selby’s a town in Yorkshire, England. I spent a vacation near there with my husband when he was alive. They eat blood pudding for breakfast. Would yo believe that?” Jantowitz blinked at her through his heavy-rimmed lenses. Outside, the sound came the bus starting and pulling away.

“Did you, er, bring the custom back here?” Hugh asked.

“You’re kidding. I wouldn’t give that stuff to Selby.” She handed each of them a ring with tw keys. “One’s for the room. One’s for the front door. I lock it at ten. Come on up. I’ll show you th rooms now.”

The decor was traditional, striving to preserve its memories: floral carpets; heavy drapes wi tasseled ties; vases and brass; pictures of a mountain lake and forest, house by a bridge, dark-skinne girl with flowers. But the inferior staining of the hall table and chairs failed to hide the scratches an patchy repairs. The good furniture had gone. Her world was coming apart – like everything els everywhere.

She wheezed up the stairs ahead of them, the expanse of pink stretch-slacks convulsing obscenel “It’s all guests up here. I have my own suite downstairs, past the kitchen. Breakfast is at seven-thirt dinner at six. Call before five if you want something kept late – they work all hours at the La Visitors are okay, but no drunks, drugs, or smoking in the rooms. The local watch officer will want t know you. He stops by once a week. And remember you’ve got fourteen days to register your addre with the Sheriff’s department.”

Jantowitz took the first room, which was across the landing from the top of the stairs. Hugh’s wa along a short passageway. It was plain but clean, with a double-size bed, wall closet, two uprigh chairs at a table by the window, and a small writing desk in one corner.

This’ll be fine,” Hugh said.

“Is there anything you don’t eat, any special diets?” Mrs. Ryecroft asked.

He shook his head. “Pretty much anything’s okay with me. I’m an omnivore.”

“I’ve got Mexican on for tonight, tacos and enchiladas. That okay?”

“Sounds great.”

She indicated the door across the passage with a wave of her hand. “You’ve got an English gu called David Wallis in there. Been here a few weeks. He’s okay – about your age, I’d say. You’ll mee him later when he gets back. He’s a university guy too – from a place called Cambridge. Ever bee there?”

“I know of it,” Hugh said.

“The only other person right now is across on the other side of the stairs. Ingram – some kind engineer. But you don’t see much of him.”

“Mrs. Ryecroft.” Jantowitz’s voice came from his room at the head of the stairs.

“*What*?” Her response would have been fitting had he been on the far side of the street.

Hugh looked out. Jantowitz appeared in his doorway, steering Selby not ungently but firml around the doorpost with a foot. “Mrs. Ryecroft, I am sorry, but the room is now my space and pa for, and the animals I cannot have. Will you talk to her or whatever it is that you do, please?”

“Is he gonna be a problem?” Mrs. Ryecroft muttered at Hugh.

“I think he has an allergy,” Hugh whispered, naming the first thing that came to mind. “He okay.”

“Oh, okay.” She bustled away back along the passageway.

It was defensiveness, Hugh decided. Her noise and bluster tried to present a defiant face, a overcompensated. Underneath it, she was scared and insecure. Everybody was.

He moved to the window and lifted aside the net to peer out. The room was at the rear of th house. The yard was paved for a short distance, with weeds sprouting through cracks. Farther back w a forgotten lawn with seats and a garden table. Wooden slat fences separated it from adjoining yar to the sides and rear. In one of them, children were playing on a creaky swing set. A small, yappin dog pranced around them. Hugh sighed and let the net fall back again.

Chapter Six

David Wallis came in shortly before six. He was breezy and direct in the way that old movie liked to depict as characteristically British. No garish dress, cosmetics, or hair coloring; instea naturally sandy hair cut short and conventionally, a fresh complexion, and a patterned woolen sweat with plain twill pants. No mirror glasses to be inscrutable behind, nor display of the calculate offensiveness that many seemed to mistake for being assertive. He greeted the arrivals with a sol handshake and a grin that came easily. “So you’re the new faces that we’ve been expecting. Not th I’ve been here that long myself. As Mrs. R.’s probably told you, I’m not used to these wide ope spaces.”

Ingram, the engineer, did not put in an appearance that evening. Over dinner, Hugh and Jantowi learned that Dave was an optical electronics specialist, single, and liked cars and anything mechanica He also confided, since they’d find out for themselves tomorrow, anyway, that he was with the proje that they would be joining. He didn’t respond when Hugh probed for a hint of what the project w about.

After taking care of the guests, Mrs. Ryecroft left them to have her own meal in the kitche Jantowitz excused himself too, saying that he was tired after the day’s traveling and would read little, then retire early. Hugh and Dave were left to finish their coffee alone.

“What is there to do in the evenings?’ Hugh asked.

“What kind of thing are you looking for?”

Hugh shrugged. “Nothing special. Just to look around, see where the people go. Get a drin maybe.”

“There’s a Community Center here in town that most Lab people use. Also, a couple of oth places that are a notch or two above your average redneck stomping shops and watering holes.”

“Are you busy?”

“I am tonight. We’re working a late session.”

“Does that happen often?”

“There’s a lot going on.”

“How far from here is it?”

“Oh, we’re only at TA-3 – across the bridge on the South Mesa. It’s walkable, but there’s a bus can catch in half an hour. Why do things the hard way?”

“You don’t have any wheels, then?’ Hugh said.

Dave shook his head. “Too much hassle getting the permits. Anyway, the Lab runs its own shutt buses around the area. They’ll take you to most of the places you’ll want to go. There’s a pickup poi on Trinity Drive, just at the end of the street.”

“Is it safe around here?’ Hugh asked.

“Not too bad. Why?”

“Driving from the airport this afternoon felt like we were going through a war zone.”

Dave sighed. “It’s getting crazy out there,” he agreed. “And places like this can become speci targets – along with the people who work in them. You know how it is: eco-terrorists, anarchi

guerrillas – the ones who think that science is the cause of all the world's problems. A month or tw ago, they got one of the beam-weapons designers with a car bomb. Nasty. But he had this place out the middle of nowhere that he'd built himself and wouldn't leave. You'll be all right up here in tow This location's like a fortress."

Hugh digested the information, then changed the subject. "You didn't have any trouble getting here? I mean, being from another country – a high-security place like this."

"I worked on military stuff before, which probably helped," Dave answered. "The Mother Count and the States are closer than most people realize when it comes to skullduggery and intrigue. But was all up in the air for a while. At one point I almost told them to forget it. I'd already got an off from Eurospace Engineering in Germany – straight satellite Optronics."

"Without all the security hassle?" Hugh said.

"A lot less hassle, anyway."

"So why didn't you take it?"

Dave shrugged "I was too hooked on MV physics. The work at Cambridge had run out of fundin and it wasn't going to be renewed – due to pressure from the U.S., I suspect. Coming over here was t only way to stay in the field. I'm sure you know yourself how it is."

Hugh knew exactly how it was. Working in the new physics of quantum-connected univers generated a curiosity that was compulsive.

"MV physics" was a professional's term. The "parallel universes" that Hugh had talked about Alice accorded with the popular conception of the subject, but was a simplification. The other realiti existed not as discrete, separate entities stacked like the pages of a book, but as a smoothly varyi continuum. Hence, the Alices that he had described were not "other" Alices, existing detached a apart from each other, but different components of the same "super-Alice," all acting in different wa in their variously differing circumstances.

This peculiar conclusion followed from one of the earliest questions that quantum mechanics h addressed. The question had to do with the fact that many processes in physics have several possib outcomes – such as which particular level, of the various permissible levels that exist, an excited ato will return to after absorbing energy. In a given case, there was no way of knowing in advance whi of the alternatives would actually occur, although the probabilities could be calculated ve accurately. How, then, did Nature "choose" which of the possible outcomes would become rea Various explanations had been considered in almost a century of argument, none of them satisfactor All they seemed to agree on was that reality was a lot stranger than unaided imagination was probab capable of conceiving.

The currently accepted answer was known as the Many Worlds Interpretation. According to th view, *all* of the possibilities did, in fact happen and were equally real! Each alternative led to different region of reality, which in turn included all the possible consequences. The "true" univers or "Multiverse" – hence MV – thus forms an enormous branching structure, extending in virtually infinite number of dimensions, in which everything that could happen, future and past as well present, exists somewhere. Nearby parts of the Multiverse tend to be similar. More distant regio become progressively more different. Different in what way depends on the direction.

The sequence of events making up an individual's experience represents merely one possible pa through the totality, determined by chance, choice, or more generally a combination of both. Th

picture accommodated and resolved the classical conflict of determinism and free will: In th
Multiverse, everything is determinate; which parts of it a particular consciousness will come to know
however, are not.

Dave declined to answer when Hugh asked how MV physics was being applied at Los Alamo
"You don't talk about what you don't have to," he said. "They'll tell you what they want, when the
want to."

That was fair enough, Hugh thought. He wasn't in Berkeley now. "What kind of thing were yo
doing at Cambridge, then?" he asked instead.

Dave hesitated for a second. "I was in an experimental psychology lab." Hugh frowned. He hadn
heard of any related work in that field. "Part of a group studying intuition and the roots of huma
genius," Dave said.

"What does MV work have to do with things like that?"

"Sony, Hugh. That's all you get." Dave looked at his watch. He stood up and moved to the doo
"Well, I probably won't see you again tonight. What's your schedule for tomorrow?"

"We're being collected first thing," Hugh answered.

"Okay. I'll probably bump into you sometime later in the lab. Have fun." He disappeared, an
Hugh heard him putting on his coat in the hall. Hugh sipped his coffee, staring distantly at the emp
doorway. His own MV expertise spanned the physics in general, and he could see how it would b
relevant to any likely application here. But why Theo? What could be going on that would have roo
for a mathematical biophysicist? It was the first time that he'd really stopped to ask himself th
question. Dave certainly wasn't giving anything away.

"Okay, Dave, I guess I can see your point," he called out absently. "I mean, for all you know,
could be undercover security, trying to catch you out, couldn't I?"

Dave stuck his head back around the door. "Oh, I don't think so," he said lightly. "I didn't, eve
before you arrived."

Hugh sent him a puzzled look. "How could you? We've only just met. How could you have forme
any opinions about me before?"

Dave smiled at him mysteriously. "You'll find out," he said.

sample content of Paths to Otherwhere