

A decorative border with intricate floral and scrollwork patterns surrounds the text. The border is composed of dark grey lines and shapes, creating a frame around the central text.

Voyage to Tomorrow

**James P. Hogan
(continuation)**

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VOYAGE TO TOMORROW

A Novel

Sequel to Voyage From Yesteryear by James P. Hogan

For those who plant trees under whose shade they will never sit.

*“The question is not whether a civilization can be transplanted.
The question is whether the seed knows it has already been
planted.”*

PART ONE: DEPARTURE

Chapter 1: The Weight of a Perfect World

The steam locomotive came around the long curve from the south, exhaust rising white against the blue-green morning sky, and Colman watched it from the terrace of the apartment block with the particular attention he gave to things he was learning to remember.

Alex sat on the terrace railing with both legs dangling over the side, which was seven meters above the plaza. Colman had stopped trying to address this weeks ago. The rail was wide enough for a four-year-old to sit on comfortably, and the drop was survivable if not comfortable, and in the end he had concluded that the level of vigilance required to keep Alex off elevated surfaces was incompatible with any other activity.

“Is that Jay’s train?” Alex asked.

“One of them.”

“How many does he have?”

“Two, so far. He’s building a third.”

Alex considered this with the focused seriousness he gave to all engineering questions. “Why does he need three?”

“He probably doesn’t need three. He wants three.”

“What’s the difference?”

Colman thought about it. “Needs are the floor. Wants are the ceiling. On Chiron, Jay can have as many ceilings as he likes.”

The train crossed the open plaza at about thirty kilometers per hour, which was slow enough to be impressive, trailing its white plume. A cluster of people on the lower level stopped to watch it pass — some children, several adults who should have known better than to have stopped and did not seem bothered by this. Jay had begun running a proper schedule six months ago, which meant the locomotive was a regular part of Franklin's morning, and it still drew an audience. Colman suspected it always would.

"I want to go on it before we leave," Alex said.

"Then you should tell Jay that."

"He'll say yes."

"He will."

"Because everything's yes here."

Colman looked at his son. The boy had said it without any particular weight, the way you might observe that the sky was blue or that water was wet — a fact of the environment rather than a judgment about it. He was four years old. He had never lived anywhere where things were not yes, and the idea that they could be otherwise was still theoretical to him, a thing from his parents' stories.

This was precisely what Kath had meant when she said there was no real way to explain Chiron to Alex. You could only take him to the places where things were not yes, and let him work it out for himself.

"Your mother wants you inside," Colman said.

Alex swung his legs back over the railing with the easy athleticism of a child who has never been frightened of heights. "For what?"

"Breakfast, probably. She didn't specify."

“She always specifies.”

This was true. Kath’s communications were typically precise. “Then she’s making an exception.”

Kath was standing in the doorway behind them, which suggested she had been listening. She had a way of appearing in doorways without making a production of it. She looked at Colman with the particular expression that conveyed mild amusement at nothing in particular, which was one of the three or four expressions that constituted her full range.

“Bernard commed,” she said. “He wants you at the fabrication center by ten.”

“What for?”

“He didn’t say. He sounded pleased with himself.”

“He always sounds pleased with himself when he’s about to show someone something that took three years to build.”

“Then it will probably be worth seeing.”

Alex had already gone inside. Colman remained at the railing for a moment, watching the locomotive complete its arc through the plaza and disappear around the building into the freight district. Jay had laid twelve kilometers of standard-gauge track in the past two years, which had required the cooperation of several hundred Chironians who had never heard of standard gauge and found the concept charming. He had not asked for permission to do this. No one had told him he couldn’t. The track simply existed now, winding through Franklin like something that had always been there, and the locomotive ran on it three times a day on a schedule posted at the three existing passenger stations.

Jay was staying. His wife was staying. His young son, who was named Martin and who currently showed a strong preference for the locomotive over all other things in his world, was staying.

Sirocco was staying. He had twin daughters with Shirley, a Chironian woman who had a lab in the biology complex and who found Sirocco's Army career marginally less interesting than her research but had apparently decided he compensated in other ways. Hanlon was staying — his martial arts academy was fully subscribed and he had started a second session on Thursday evenings. Swyley had not left the film studio in two months except to sleep. Stanislau had three active software projects and had recently declined an invitation from the astrophysics department on the grounds that he was already at capacity.

D Company, which had briefly been the sharpest instrument in the system, had scattered itself across the most comfortable civilization in human history and was, as far as Colman could tell, entirely content.

He understood this completely. He was leaving anyway.

The fabrication center was two kilometers from the apartment in the eastern complex — a long, low building that had been extended twice in the past eighteen months and now covered more ground than anything else in Franklin except the primary production facility. Bernard Fallows was waiting outside the main entrance, which meant he was impatient, which meant whatever he wanted to show Colman had probably been finished overnight.

Bernard was fifty-two now, with gray at his temples and a permanent slight tan from the outdoor work at the launch facility. He had the compact, efficient posture of an engineer who had spent decades in spaces where efficiency was not optional, and he retained the habit of carrying a handheld display with him everywhere even though most

of the displays at the center were fixed screens large enough to read from across the room.

“You’re three minutes late,” Bernard said.

“I walked.”

“There’s a transit system.”

“I know. I walked anyway.” Colman looked at the building. “What did you finish?”

“Come inside.”

The fabrication center smelled of machine oil and ionized air and the particular dry, almost-metallic scent of the composite material the Chironians used for structural components. Colman had spent enough time here over the past two years that the smell was automatic now, not something he noticed unless he was paying specific attention. Bernard led him through the front workspace, past a line of technicians working at benches — two Chironian engineers and one young man named Tessaro who had arrived on the EAF ship and who had apparently decided that materials science was more interesting than politics — and through a heavy door in the rear wall.

The room beyond was a clean environment, which meant pressure suits and filtered air and no eating. Bernard handed Colman a pair of protective glasses.

On the central table was an assembly approximately the size of a large suitcase. It was made of the Chironian structural composite and what appeared to be ceramic-insulated tubing, and it was connected to a small control panel on a separate stand. It was not impressive to look at.

“That is the smallest operational antimatter confinement cell ever built on this side of any star,” Bernard said, with the satisfaction of a

man who has been waiting some time to say something. “Full magnetic containment. Adjustable energy output from zero to seven kilowatts. Sustainment period of approximately forty-two hours per fuel charge.”

Colman looked at it. “Portable.”

“Easily. It weighs nineteen kilograms.”

“And you can charge it here.”

“You can charge it anywhere there’s a standard antimatter feed. Which will shortly include every fabrication station we’re installing in the Congreve.” Bernard picked up the control panel. “We tested it at full output for six hours last night. No confinement anomalies, no field distortion. Chironian engineering is good work.”

“It’s very small.”

“Yes.” Bernard set the panel down. “That’s the point. It’s small enough to carry. Small enough to leave somewhere. Small enough that you could put it in a building, connect a few output lines to the building’s systems, and that building would have reliable power for as long as someone remembered to recharge it.” He paused. “Six-week recharge cycle, incidentally.”

“You’re thinking about what we find.”

“I’m thinking about what we leave behind.” Bernard took off his glasses. “The ship’s main fabricators are going to be the obvious focus when we arrive. Everyone will want them, everyone will argue about who controls them, and this will be a problem. But a device this size — a portable fabrication unit, a portable power source — that’s a different conversation. Nobody tries to control something they can’t see.”

Colman considered this. It was typical Bernard — not the tactical problem in front of him but the problem behind the tactical problem, the one nobody was looking at yet. “How many of these can you build before departure?”

“Depends on how many I’m building them for.” Bernard’s expression shifted slightly. “The main mission kit is already spec’d. These would be extra. Unofficial.”

“Define unofficial.”

“Not in the primary manifest. Not subject to committee approval.” Bernard paused. “Lechat approved them this morning. He just suggested I not include them in the briefing slides.”

Colman thought this was very much like Lechat, and said so.

They spent an hour going over the specifications. The portable confinement cell was rated for six standard output configurations, meaning it could drive a fabricator unit, a medical scanner, a communications relay, or a basic manufacturing workbench. Bernard had already specced a second device that combined the power cell with a basic molecular fabricator — about the size of a large backpack, capable of producing any object with a material complexity up to about that of a circuit board, drawing its feedstock from locally available materials.

“How locally?” Colman asked.

“Atmospheric compression for basic polymers. Ground minerals for everything heavier. It’s not fast — we’re talking about a few hundred grams per hour for complex assemblies — but it works indefinitely without external supply.”

“And you can teach someone to use it.”

“I can teach someone to use it in an afternoon.”

“An afternoon,” Colman said.

“An afternoon,” Bernard confirmed. “The interface is Chironian-designed. It assumes the user has no prior technical knowledge and proceeds from there. Input a description of what you want. The system works out the composition. You wait.” He looked at the confinement cell. “The Chironians spent a great deal of effort making these things as self-explanatory as possible. I suspect they anticipated applications we haven’t thought of yet.”

Colman thought this was probably accurate. The Chironian approach to tool design was to assume the user was intelligent and the tool should match that intelligence. It was a different assumption from the one that had produced most of Earth’s technology, which had assumed users were unreliable and the tool should compensate accordingly.

“We’re going to find people who’ve been surviving for eleven years,” Colman said. “Some of them will have technical infrastructure. Most of them won’t. Some of them will have been making decisions about resource allocation for over a decade.”

“Yes.”

“Those decisions are going to have created systems. Social systems, political systems. Some of those systems are going to be built around whoever controls the food supply or the medicine or the fuel.”

“Also yes.”

“And when we hand them a device that produces food and medicine and power for free, indefinitely, from ambient materials—”

“It will be deeply disruptive to those systems,” Bernard said. “I know. Kath’s been working through the analysis for the past six months. The short version is that the Chironian model isn’t appropriate for direct transfer to a post-holocaust civilization. You can’t give people

abundance the way you give them a present. Not if they've built an identity around surviving scarcity."

"So what do you do?"

Bernard smiled. "You teach them to make the tools. That's different from giving them the tools." He picked up the portable confinement cell and turned it in his hands. "Hogan was one of the architects of this. He said — and this was about three months after the Congreve's conversion started — he said, 'We aren't going to Earth to rescue anyone. We're going to Earth to demonstrate that rescue was never necessary.'"

Colman looked at the device. "He means the scarcity was always artificial."

"He means the scarcity was always a choice. Even if it wasn't perceived that way." Bernard set it down. "The same forces that made Phoenix fail on Chiron are still present on Earth, even after a holocaust. The scarcity is real now — people are genuinely short of food, medicine, power. But the mechanisms that manage that scarcity, the hierarchies and authorities and systems of control — those are chosen, not forced. They felt forced, and they feel forced, but they're not."

"That's a hard argument to make to someone who's been going to bed hungry for eleven years."

"It's a very hard argument," Bernard agreed. "That's why you don't make it. You just set up the fabricator and walk away and let them figure out what it means."

The apartment in the evenings had a particular quality that Colman had started to notice without quite managing to catalog. It was to do with the light — the blue-shifted quality of Alpha Centauri A's illumination, which was similar to Earth's but not identical,

producing shadows at slightly different angles than his nervous system had been calibrated for by a childhood that had nothing to do with this world. He had lived on Chiron for eleven years now. He had almost calibrated.

Kath was reading, which was her default evening activity. Alex was ostensibly asleep, which Colman knew from his footfall patterns meant he was instead lying on his back in the dark thinking about whatever four-year-olds thought about in the dark. Possibly locomotives. Possibly the trip. He had been told about the trip in terms appropriate for a four-year-old, which meant he knew they were going on the big ship and it would take a long time and they would see Earth, which was where Daddy had come from.

He had asked, once, whether Earth was like Chiron.

Colman had said: not exactly.

Alex had thought about this and said: is it better or worse?

And Colman, after a pause longer than he'd intended, had said: different.

He had not been satisfied by this answer. Neither had Colman.

Kath looked up from her reading. "You're quiet."

"I'm thinking."

"About what Bernard showed you?"

"Among other things."

She turned a page. She read physical books when she could get them, which on Chiron was easy — the printing and binding shops ran on demand at the fabrication center, and the entire contents of what had been recovered of Earth's libraries were freely available in searchable

digital form, but Kath preferred the physical medium with the particular firm preference of someone who had thought about it and arrived at a conclusion. “Among what other things?”

“About Jay’s railroad,” Colman said. “About why he built it.”

“Why do you think he built it?”

“Because he wanted to. Because he could. Because on Chiron, if you want to build a railroad, you build a railroad.”

“That’s part of it.”

“What’s the rest?”

Kath considered. She had a way of considering questions that suggested she knew the answer before she began but found the process of arriving at it correctly more satisfying than simply stating the destination. “He built it because it was a thing from the world his parents came from. A specific thing, specific in its engineering and its materials and its history. Not better or worse than Chironian technology — different. Preserving a different way of doing something.” She paused. “He’s documenting something. He may not think of it that way.”

“He’s creating a record.”

“He’s creating an artifact. There’s a difference. A record is description. An artifact is a thing that demonstrates by existing.” She turned another page. “When we get to Earth, if there’s anyone left, they will want to know who we are and where we came from. The artifact is better testimony than the description.”

Colman thought about this. Outside, the city made its evening sounds — the distant rumble of a fabrication run, the closer chatter of people in the plaza below, someone playing a stringed instrument two floors down with the easy competence of a person who played for

pleasure and had nothing else riding on it. These were the sounds of a civilization that had never had anything to prove and had therefore stopped proving things several generations ago.

“I’m going to miss it,” he said.

Kath looked up again, this time with a slightly different expression. This was the warm one. “You can miss it and still go.”

“I know.”

“Missing something is not a reason to stay.”

“I know that too.”

“Then what’s the question?”

He thought about it. “The question is what we look like from the other side. What we look like arriving at whatever’s left of Earth with our abundant ship and our fabricators and our clean food supply and our political philosophy and our three hundred and fifty people who have never gone hungry in their lives.”

“We look like help,” Kath said.

“We look like something,” Colman said. “I’m not sure help is what they’ll call it.”

She closed the book. “Steve. In eleven years on Chiron, did you ever once feel that you were being helped by the Chironians?”

“No. I felt—” He stopped. “I felt like I was being shown something.”

“Yes.” She picked the book back up. “That’s the distinction. Help implies a deficiency that needs to be remedied. Showing something implies that the capacity was already there.”

From the direction of Alex's room, a small voice said: "What are you talking about?"

"Nothing that requires your contribution," Colman said.

A pause. Then: "Are we still going on the ship?"

"Yes."

"When?"

"Six months."

"How long is six months?"

"About as long as it feels."

Another pause, longer. Then the sound of a small body settling back into sheets, satisfied with this answer in the specific way of a child who has extracted enough information to sleep on. Colman and Kath looked at each other. He was aware that she found him faintly amusing on a more or less permanent basis, and had made a kind of peace with this. It was better than alternatives he could name.

The Separatist Party had ceased to exist as a formal body four years after the dissolution of Congress, not because it had lost the argument but because the argument had ceased to be about anything distinct. The Integrationist Party had lasted another two years before its membership had drifted away into various research programs and community projects and — in the case of one former representative — a ceramics workshop that was widely regarded as producing the best handmade cups in Franklin.

Paul Lechat had watched this process with the interest of a man who had driven a vehicle for twenty years and was now watching the vehicle drive itself.

He was sixty-one years old. He was, by any standard, lean and precise in his movements, with the compressed energy of someone who had spent decades making difficult decisions in small rooms and had learned to take up exactly as much space as necessary and no more. He had commanded ships, led political movements, survived the worst night of his life (the coup), and subsequently devoted five years to what he called administrative dissolution and what Bernard privately called cleaning up the mess without admitting it was a mess.

He was now Mission Director of the Henry B. Congreve, which was a title he had invented, which was appropriate.

Colman met with him once a week in the six months before departure — not at the ship, which was docked at the primary orbital facility and not easily accessible without scheduling, but at the small office Lechat maintained near the transit center in Franklin, which was convenient and which had the advantage of being close to the tea house that occupied the ground floor of the adjacent building and that served a particular blend that both of them had independently decided was the best thing available in Franklin that wasn't the view.

The meeting six months out was a planning meeting. There were three more people in the room: Bernard, who was running the technical side of the departure; Kath, who was running the harder-to-name side that involved the two hundred and seven Chironians who had decided to make the voyage; and Linh Nguyen, who was the Congreve's first officer of engineering and who had been brought into the planning four weeks earlier.

Linh Nguyen was thirty-two, Chironian-born, of Vietnamese and various-other-things heritage — the Chironian genetic pool was a comprehensive artifact of the best intentions of mid-twenty-first-century demography, and she had the high cheekbones and direct gaze that suggested her ancestry was interesting without being particularly bothered by it. She had a physicist's economy of

movement and an engineer's habit of producing exact numbers where other people produced approximations.

"The departure manifest as of this morning," Bernard said, and distributed a handscreen to each of them. "Three hundred and forty-nine people. Two hundred and seven Chironian. One hundred and forty-two former Terran, of whom approximately eighty have been on Chiron long enough to be effectively Chironian in everything except birthplace."

"Effectively Chironian is a phrase I'd want to define before I used it," Lechat said.

"Fair. I mean they've adopted Chironian ways of thinking to the point where the original conditioning is no longer the dominant operating system. The remaining sixty-two are people who are going back to Earth because it's Earth, and whatever's happened to it, it's still Earth, and it's still home."

"And if it isn't?" Linh asked.

"If it isn't what?"

"If it isn't home anymore. If the thing they remember doesn't exist."

Bernard looked at her with the mild expression of someone whose engineering training made him patient with imprecision when it came from smart people who were thinking out loud. "Then they'll be sad, and they'll have to revise their expectations, and they'll still be on the ship with the rest of us."

"Which seems like a simple answer to a complex question," Linh said.

"It's the honest answer. The complex answers all involve lying to them about what we expect to find."

Lechat set down his handscreen. “What do we expect to find?”

“We don’t know,” Kath said. “We know the last laser transmissions described what sounded like coordinated nuclear exchange across multiple northern hemisphere theaters. We know there was a twelve-day period of fragmented, deteriorating signals and then silence. We don’t know how much silence equals total extinction and how much equals sufficient social disruption to end organized long-range communication.”

“Meaning some people could have survived,” Lechat said.

“It would be unusual for any large-scale catastrophe to kill everyone. The question is at what level of organization the survivors are operating. Are they villages? Nations? Something in between?”

“And what do we do based on that answer?” Linh asked.

There was a silence that had a specific quality. Colman recognized it as the silence that preceded the statement of something everyone in the room already understood but no one had yet organized into words.

“We don’t know that either,” Kath said. “Not yet.”

This was not entirely accurate, Colman thought. They had plans for several scenarios. What Kath meant was that the plans were not yet the sort of thing you distributed in a pre-departure briefing. Which was characteristic of the Chironian approach to sensitive information: the information existed, was available to anyone who asked the right questions, and was not volunteered to people who hadn’t asked.

He caught Linh Nguyen’s eye. She had also noticed the pause. She was looking at Kath with an expression that was not quite skeptical and not quite trusting, somewhere in between — the expression of a

person who knows the answer they're being given is not the whole answer and has decided to wait for a better opportunity to ask.

She would fit in fine, Colman thought.

The last formal business meeting of the Founders Council before departure took place in Gracie's studio, which was large enough and had a long table that someone had once built for a community project and which had been kept because it was beautiful. The studio was on the coast, two hours from Franklin by transit, and Colman and Kath had taken the night before to travel there because Alex had not seen the ocean yet.

He had stood at the water's edge for forty minutes, not speaking, watching the waves with the focused attention he gave to all mechanical questions. Then he had said, very quietly: "How deep is it?"

"Here? A few meters," Colman said. "Out there, a few kilometers."

"How does it move like that?"

"Tidal forces, mostly. Gravity from the moons."

Alex looked at the moons. Romulus and Remus, one larger and one smaller, both visible in the afternoon sky. He had been told the story of the weapon on Romulus in the age-appropriate version, which meant he knew that some people had wanted to hurt Chiron and other people had stopped them. He had not yet asked about the specifics of how they had stopped them. That question was probably coming.

"Are there fish?" he asked instead.

"Yes."

“Can I see them?”

“Tomorrow, probably. Today we have a meeting.”

He had accepted this with the equanimity of a child who had learned that meetings were a feature of adult life and that adults could not always explain their purpose in advance.

The meeting included Otto and Chester and Leon from the original Founders group, Gracie herself, and three newer voices — Hogan (who had organized the ship’s technical conversion), Petra (who had built the distribution network for the fabrication units), and Yuen (who had done most of the analytical work on the Earth survival scenarios).

They discussed the departure for three hours. Colman spent most of this time listening. The issues were not primarily technical — Bernard had the technical side organized to a precision that made planning documents seem like poetry by comparison — but operational and philosophical, which meant they required the kind of argument that couldn’t be resolved by reference to known facts.

The core question, which kept appearing in different forms throughout the afternoon, was: what do the Chironians who are making this voyage expect to find, and what authority does that expectation give them?

It was Leon who put it most directly. He was seventy-four now, with white hair and the particular gravity of a man who had built something from nothing and knew what nothing looked like. “Two hundred and seven people are going on this ship. Most of them have never seen a world that operates the way Earth operates, or operated. Their picture of it comes from the history files and from what the Terrans who’ve been here have told them, and from Colman and the others who were on the Mayflower II. That picture is incomplete.”

“All pictures are incomplete,” Chester said. Chester was the historian of the group, which on Chiron meant he was also the philosopher, which meant he was usually the most careful about precision. “The question is whether the incompleteness is relevant to the mission.”

“It’s relevant if it means our people arrive expecting something they’re not going to find and react to the gap between expectation and reality in unhelpful ways.”

“What would an unhelpful way look like?”

“Superiority. The assumption that because we’ve solved the problem of how to live together, we know something that Earth’s survivors don’t know, and that the appropriate response is to explain it to them.”

“That is an accurate assumption,” Yuen said. She was the youngest person at the table, thirty-six, and spoke with the particular precision of someone who has spent a long time working with data and has stopped being surprised by what data shows. “We do know something they don’t know. The question is whether knowing it is the same as being able to explain it.”

“It isn’t,” Kath said. She had been quiet for most of the afternoon, which for Kath meant she had been thinking and was now arriving at the end of the thought. “Lechat’s generation — the Mayflower II people — they understood it, eventually. Not all of them, but the ones who mattered. But they arrived with forty years of Earth conditioning and had to revise it in a world that was showing them something different. That revision was painful and took time and required them to want to make it.”

“And the people we find on Earth?”

“They’ve been surviving a holocaust for eleven years. Their conditioning is not forty years old, it’s eleven years old, and it’s been reinforced continuously by conditions that made submission to

authority actually adaptive. Following orders kept people alive. Sharing resources only within your group kept people alive. Trusting the person who controlled the food supply kept people alive.” She looked around the table. “They’re not going to be interested in revising their conditioning based on a philosophical argument from people who showed up in a well-fed ship.”

“Then what are they going to be interested in?” Otto asked.

“What everyone is interested in when they’re frightened and exhausted. Food. Medicine. Safety. Not dying.” Kath folded her hands on the table. “We give them that first. Not as a demonstration of anything, not as a lesson, just as what it is — abundance, shared freely because there’s no reason not to. And then we leave the fabricators and show them how to use them, and we go home.”

“And if they fight over the fabricators?”

“They will fight over the fabricators.” She was entirely calm about this. “The fighting is part of the process. The fabricator keeps working regardless of who’s fighting over it, because the fabricator doesn’t have an owner and isn’t attached to any faction and doesn’t run out. Eventually the fighting settles into something that’s not worth fighting over, because the thing everyone was fighting to control keeps being available to everyone.”

“That assumes the fabricators remain operational,” Colman said.

“They’re very hard to break. Bernard designed them specifically with that in mind.”

Colman looked at Bernard. Bernard made a small gesture that could have meant several things and probably meant all of them.

“The fighting stage could be very violent,” Chester said.

“Yes,” Kath said. “It probably will be.”

“And we just—”

“We can’t manage the violence. We can make sure the fabricators keep working and that the people who don’t want to fight have access to what they need. We can’t stop people from hurting each other. The Chironians who stay behind will be equipped to help with that as much as they can, and they’ll make their own decisions about how far to go.” She paused. “But no. We don’t solve the violence problem for them. They have to do that part themselves.”

The table was quiet for a moment.

“I want to state the obvious thing,” Leon said, “because when the obvious thing is uncomfortable, people sometimes avoid stating it, and then it becomes a problem later.” He looked at the window, where the afternoon light had gone orange and the coast was doing something splendid. “The people we find on Earth are not going to want to be shown how to live. They are going to want to be saved. There’s a difference, and the difference matters enormously, and some of them are going to be very angry when they realize we’re offering them the first thing and not the second.”

The silence that followed this was not disagreement. It was the silence of people who knew something was true and were working out what to do with the truth.

“Yes,” Kath said. “That’s correct.”

Chapter 2: Departure Day

The Henry B. Congreve had been a battleship in a previous life, which was visible if you knew what you were looking at and invisible if you didn’t. The Battle Module that had once occupied the forward position had been replaced by a new nose section — wider, less angular, with shuttle bays and the transparent panels of a recreation

deck and a research complex that occupied three full levels. The antimatter drive at the stern was new, completed from the Kuan-yin prototype under Bernard's supervision, quiet and dense and immensely capable. The ship's mass was roughly the same as before but its character had been entirely revised, the way a house that's been lived in long enough stops being whoever built it and becomes whoever lives there now.

It sat in the orbital dock six hundred kilometers above Chiron's northern continent, where it had been for eighteen months of refit and where it would remain for another three weeks while the final crew and cargo transfers were completed. Departure itself was a date on a calendar: the third of the sixth month of the thirteenth year of the Chironian calendar's new epoch — a calendar the Chironians had invented without any sense of ceremony, simply because it was convenient to have a common reference point, and had chosen the arrival of the Mayflower II as the zero point because it was the most obvious date everyone agreed had actually happened.

The farewell ceremony took place at the base of the transit tower, which was the cable-car system that connected Franklin to the orbital dock and which had been running continuously since Jay had helped commission it four years ago. It was not a formal ceremony in any sense that would have been recognized by the Earth that had sent the Mayflower II. There were no uniforms, no speeches, no honor guard. There was a very large number of people who wanted to say goodbye, and a transit system that could move about two hundred of them per hour to the dock, and a morning that had decided to be perfect — cool and blue, with the kind of low-angle light that made everything on the coast look like a painting of itself.

Jay Fallows was at the bottom of the tower with Martin on his shoulders. Martin was eighteen months old and found the crowd exciting. Jay was thirty-two now, with the outdoors tan of a man who spent a significant fraction of his time maintaining a railroad in all weather, and the contained happiness of someone who had built a

life that fit him precisely. He had his father's direct gaze and his mother's capacity for warmth, combined in a way that was distinctly his own.

"You could still change your mind," he told Bernard.

"I'd be terrible at steam railroad maintenance," Bernard said.

"It's not complicated."

"Everything is complicated. It just looks simple from the front." Bernard put a hand on his son's shoulder. "Keep the manifolds clean."

"The manifolds are always clean."

"That's because you keep them clean. Don't stop."

This was, Colman reflected, a conversation about the railroad that was not entirely about the railroad. Bernard had been saying goodbye to Jay for six months, in the specific way of a father who knows the goodbye is real this time and has decided not to make it a production.

Jean Fallows was standing three meters away, talking with a cluster of women from the biochemistry program. She was sixty now and had the calm of someone who had arrived, very thoroughly, at the place they were meant to be. She had spent the years since the *Mayflower II* transforming what had been a fear-based view of the world into something cleaner and more accurate, and the transformation was visible in her posture, in the directness of her gaze, in the way she moved through the crowd without the small anticipatory flinches that Colman remembered from the early days. She was not coming on the voyage. She had a research program to run.

She caught Colman's eye and gave him a nod that carried several things in it, and he nodded back, and that was sufficient.

Wellesley was not at the ceremony, officially. He had retired to the farm in Occidena two years earlier, and officially had nothing to do with the mission or its departure. Unofficially, he had sent a message through Lechat that read: *I hope you find something worth finding. I believe you will.* The "I believe" was significant. Wellesley rarely committed to beliefs he hadn't verified. Whatever he thought was on the other side of that voyage, he thought it was real.

Sirocco was at the ceremony, which Colman had expected, and was present with Shirley and the twins, which was now the configuration in which Sirocco existed. The twins were four — exactly Alex's age — and had their mother's Chironian directness combined with something from Sirocco that manifested as a very focused ability to get what they wanted without asking anyone's permission. They were, in short, formidable.

Sirocco pulled Colman aside near the base of the tower.

"Last chance to rationalize staying," Sirocco said.

"I know."

"I've got a spare room."

"I know that too."

Sirocco looked at him with the expression he used when he was about to say something that was serious and was framing it as not. "You're good at this," he said. "Going somewhere complicated. Figuring out how it works. Finding the angle." He paused. "I don't know if that's what Earth needs. But it's probably what the mission needs."

"What does Earth need?"

“No idea. That’s your job to find out.” Sirocco extended a hand, and they shook, and the handshake lasted slightly longer than convention required. “Don’t get shot.”

“I’ll do my best.”

“Same.”

The ceremony for Lechat and Celia took place on the coast, the evening before departure.

Celia had aged well, which was the wrong phrase for what had actually happened. She had become more precisely herself — the intelligence that had always been there was now unobstructed, not because the difficulty of her life had been removed but because she had finished the work of deciding what she was. She was fifty-four, and she and Lechat had lived quietly on the coast for five years, and quiet was not what Colman had expected for either of them, but it fit Celia in a way that, in retrospect, was obvious.

She was not coming. She had made this clear very early in the planning process, in the way she made things clear — simply, without excessive explanation, as a fact that did not require justification. The ocean was here. Her life was here. Whatever she had owed to the world’s recovery, she had paid it, and she was done.

They had dinner outside, the four of them — Colman and Kath and Lechat and Celia — with the ocean close enough to hear and the evening light doing what it did on this coast, which was extraordinary enough that none of them commented on it because comment would have been redundant.

“What do you actually expect to find?” Celia asked. This was a question she had not asked before. Colman had a feeling she had been saving it.

“Some survivors,” Lechat said. “We know that much. The transmission patterns before the silence indicated regional populations intact in several places.”

“I know what the transmissions indicated. I asked what you expect to find.”

Lechat considered. He had the habit of constructing his answers as if they were documents — complete drafts, organized and precise. “I expect to find people who have been keeping each other alive under conditions that required significant compromise of the values I spent my career trying to preserve. I expect to find hierarchies and authorities and control structures that came into existence because they were adaptive in a crisis and have now calcified into custom. I expect to find people who are frightened of what we are and what we represent, because what we represent is the possibility that their lives didn’t have to be the way their lives have been.”

Celia was looking at the ocean. “That’s a very organized answer.”

“I had a long time to think about it.”

“Will you be able to do what needs to be done without reverting to the old patterns?”

This was a different kind of question. Lechat took a moment. “I don’t know,” he said. “I’d like to think so. The training is in the brain somewhere — the reflexes of authority, the instinct to organize and command and manage. I’ve done the work of understanding why those instincts were adaptive in the wrong way. Whether that understanding holds when I’m in front of a desperate population who want me to be in charge—” He shook his head slightly. “It’s a genuine question.”

“The Chironians on the ship will keep you honest,” Kath said.

“That’s somewhat reassuring.”

“They won’t do it in an obvious way. They’ll just keep being what they are. Which is its own kind of pressure.”

Celia turned from the ocean. She looked at Colman. “And you?”

“I’ll manage the hardware,” Colman said.

She smiled, which was rare enough to be notable. “Right.”

They stayed until the moons rose. Lechat and Celia walked with them to the transit station, where the last car of the evening was waiting. The farewell there was brief and complete in the way that farewells are when everything necessary has already been said and what remains is the physical fact of parting, which requires no additional words.

Kath took Colman’s hand on the transit car. He looked at her and she looked at him and neither of them said anything about the conversation at dinner, because neither of them needed to. After eleven years, they had a conversational economy that meant the important things were communicated without much in the way of signal.

Alex was asleep across from them, head against the window, watching the coast slip past in his sleep with an expression of concentrated interest that might have been dreaming or might have been Alex’s version of ordinary sleep, which was concentrated interest with the eyes closed.

“He’ll be fine,” Kath said.

“I know.”

“He’s ready for something hard.”

“He doesn’t know it’s hard.”

“That’s what ready looks like.”

The ship lifted on the appointed morning.

The transit tower was full from early — there were not enough spaces on the observation decks for everyone who wanted a direct view, so most of Franklin watched on screens, which had been installed in the plaza and along the main transit corridor and at several viewpoints that had previously served other purposes. The Chironians watched with the calm attention they gave to interesting events. The former Terrans watched with something more complicated — an emotional register that combined pride with loss with hope with the particular species of anxiety that attaches to things you care about leaving your sight.

Alex watched from the transit tower’s upper deck with Colman’s hand in his and his eyes wide.

The launch was not dramatic, by the standard of drama. The Congreve didn’t lift on a pillar of fire or shake the ground. The antimatter drive produced its thrust in a way that was smooth and deeply, wrongly quiet — a hum felt in the bones rather than heard in the ears — and the ship simply rose from the dock, slowly at first and then with a gathering purposefulness, until it was a brilliant point of light against the blue that became something else and then was gone.

Alex watched the point where it had been for a long time.

“Will it come back?” he asked.

“In about two and a half years,” Colman said. “To pick up the people who stay behind on Earth.”

“And then?”

“And then back to Chiron.”

“And then we’ll be home.”

“Yes.”

Alex thought about this with his characteristic focused seriousness. Then he said: “I’m not on it.”

“What?”

“The ship. We’re down here. We’re not on it.”

“We board tomorrow,” Colman said. “That was the supply run.”

A pause. “Oh.”

“We go up in the transit car tomorrow morning. Early.”

Alex processed this. “How early?”

“Very.”

“Before breakfast?”

“You can bring breakfast.”

He seemed satisfied by this. They stayed at the tower until the crowd thinned, and then they walked back through Franklin in the morning that still had the particular quality of perfection that Chiron’s mornings regularly achieved, and Colman noted the quality the way you note something that you know you are in the process of learning to remember.

Chapter 3: First Weeks

The Congreve’s interior was the product of a decision the Chironians had made early in the refit: that a ship traveling for six years should

feel like a place where people lived, not a vehicle in which people were transported. The corridors were wide enough for two people to walk abreast comfortably. The common areas on each residential level were arranged around points of natural light — transparent panels looking into either deep space or into the ship's main atrium, which ran three levels through the core and was planted with vegetation from Chiron's coastal regions. The smell of it — green, slightly salty, with an undertone of something that had no terrestrial equivalent — was one of the first things passengers noticed when they came aboard.

Colman noticed it every morning when he came out of their quarters and had decided that the noticing was a feature, not an artifact. Something to be deliberately, consciously present to.

Their quarters were on Level Four, which was one level below the main residential deck and had slightly lower ceilings — not claustrophobically, but with the snug quality of a well-designed cabin rather than a room in a building. Alex had the inner room, which had a bunk and a display wall that he could configure as a window to any of the ship's external cameras. He had immediately set it to show the forward view, which was deep space in the direction of travel, and then adjusted the display settings until it showed the star field in visible and near-infrared simultaneously, which produced an image that was technically accurate and visually remarkable — the familiar stars surrounded by the fog of their heat radiation, some of them doubled, some showing the limb-brightening of active photospheres, Alpha Centauri shrinking behind them while the sun remained a dot indistinguishable from everything else.

He stared at it every morning when he woke up and every evening before he slept and periodically throughout the day for reasons that seemed to be their own justification.

The ship's complement as of departure was three hundred and fifty-one — two additional people had come aboard in the final transfers, a

materials scientist from the EAF group and a seven-year-old boy named Tomas whose parents were among the former Terrans going home. Tomas had no immediate relationship to the mission beyond the fact that his parents were going, which made him a passenger in the truest sense — along for circumstances not of his choosing, making the best of them.

He and Alex found each other on the second day. Colman learned about this indirectly: he came back to their quarters after the first full engineering briefing to find Alex absent and a note on the common table written in Alex's unsteady hand: *gone to find the farm boy. back later.*

The farm boy was Tomas, who had apparently described himself this way. His parents had a small agricultural holding in what had been the south of France, now called the Occidean highlands in the Chironian geographic system, and he had the compact, slightly serious quality of a child who had grown up doing useful work and found most indoor activities slightly less interesting than the outdoor ones.

Colman found them in the atrium on Level Three. They were lying on their backs under one of the planted sections, looking up at the vault of the atrium, arguing about something with the absorbed completeness of children who have found an argument worth having.

“It's green because of chlorophyll,” Tomas was saying.

“I know what it's green because of,” Alex said. “I was asking why chlorophyll is green. That's a different question.”

“It reflects green light and absorbs the other ones.”

“Yes, but why does it absorb those particular ones? What is it about the molecule that makes it absorb those wavelengths?”

Tomas considered this. “I don't know.”

“Neither do I. We could find out.”

“How?”

“Ask someone. Or look it up. Both are the same on this ship.”

Tomas seemed satisfied by this approach. He looked sideways at Colman. “Hi.”

“Hi,” Colman said. “Don’t be late for dinner.”

“We know what time dinner is,” Alex said, which was true. The ship’s schedule was on every display, and Alex had the schedule internalized to a degree that suggested he had memorized it within the first twenty-four hours.

Colman left them to their botanical questions.

The first general meeting of the ship’s company was on the fifth day out, when Chiron’s sun was far enough behind them to be a point of light rather than a disk but close enough that looking back still meant something. Lechat called it in the main recreation space on Level Two, which could accommodate three hundred people in reasonable comfort and three hundred and fifty-one in conditions that required goodwill.

Lechat’s command style was, as far as Colman could tell, essentially: provide accurate information, present the relevant considerations, and trust the people in the room to do their own thinking. It was not a style that maximized short-term efficiency. It was very good at producing decisions that the people making them actually owned.

He said what he knew and what he didn’t know. He said the voyage would take five years and seven months at their planned acceleration schedule. He said the intelligence about Earth was seven years old by the time they reached it. He said the mission had been designed with

flexibility in the operational plan, because the one thing they could be certain of was that the operational plan would encounter circumstances it hadn't anticipated.

"The question I want to open up," he said, "is what each of you expects this mission to accomplish. Not what the official mission parameters say — you can read those on any handscreen. What do *you* expect, and what do you want, and how do those things relate to each other?"

This produced a silence that had a thinking quality rather than a reluctant one.

A woman near the back — Chironian, young, with the direct gaze common to Chironians of her generation — said: "I want to see Earth."

"Yes," Lechat said. "That's a significant part of why two hundred of our people are here. What do you expect to see?"

"I don't know. The files say a lot of things, but files aren't the same as seeing."

"No," Lechat said. "They aren't."

A former Terran man, older, sixties, with the specific set of a person who has been thinking about this question for years: "I want to know if my sister survived. She was in Auckland when the transmissions stopped."

This was received with particular quiet. Lechat said: "Auckland is in the southern hemisphere, which puts it in the band most likely to have maintained function. We'll be making contact well before we land. We can start looking for her then."

The man nodded. He had the expression of someone who knew the odds were not good and had decided to hope against them anyway,

which was its own kind of courage.

“The southern hemisphere is where I’d look first,” Bernard said, from his seat near the front. “The nuclear exchange concentrated in the northern hemisphere theater. The south had more warning time and lower target density. If there are functional communities anywhere, they’re most likely in New Zealand, southern Australia, maybe parts of South America.”

“Most likely,” said a voice.

“Yes, most likely. I’m not offering guarantees. I’m offering engineering probability.” He paused. “The honest answer is that we don’t know. Seven years of silence is a long time. We know something survived — the physics of it suggests something survived. We don’t know what.”

Linh Nguyen was sitting three rows from Colman. She had been quiet through most of the meeting with the specific quality of Chironian quiet that meant active thought rather than absence. When the discussion moved to the technical preparation plans, she offered three precise observations about the fabrication unit configuration that Bernard incorporated immediately, which was Bernard’s way of expressing approval.

After the meeting, Colman found himself walking alongside her in the corridor back toward the residential levels.

“You have questions,” he said.

She looked at him briefly. “About what specifically?”

“About what Kath didn’t say at the planning meeting six months ago.”

This did not produce a visible reaction. “Kath says what she means to say.”

“Correct.”

“And what she didn’t say—” She stopped walking and turned to look at him directly. “The Chironian people on this ship are not going on a mission. They don’t think in terms of missions. They’re going to see Earth.”

“That’s accurate.”

“But the people who organized this voyage — Kath’s group, the people who built the Romulus weapon and the Kuan-yin strategy — they have a view about what happens when we get there that is more specific than ‘go and see.’”

“Yes,” Colman said.

“And that view wasn’t included in the briefing because—”

“Because it’s not the kind of thing that improves with committee discussion,” Colman said. “It’s the kind of thing that improves with contact with reality. The plan for Earth is more of a set of principles than a plan. The principles are the kind that need to emerge from circumstances rather than being imposed on them.”

Linh considered this. She had a way of considering things that suggested she was running internal tests on them — evaluating them against prior beliefs, looking for inconsistencies, coming out the other side with a verdict.

“And you think those principles are correct,” she said.

“I think they’re the best available,” Colman said. “Correct implies a certainty I don’t have.”

“Good,” she said. “Because I don’t have it either.” She resumed walking. “I have questions about Earth that are not in any of the briefing documents.”

“What kind of questions?”

“Personal ones.” She said this without affect, as a piece of information rather than a disclosure. “My maternal grandparents were from the Eastern Asiatic Federation. My grandfather was a regional administrator. He was part of the system that contributed to the conditions that made a global war possible.” She paused. “I want to understand what I’m responsible for. If anything.”

Colman walked with her for a moment without speaking. “That’s a question the briefing documents definitely don’t cover.”

“No,” she said. “It isn’t.”

They came to the level junction and separated — she had an engineering shift in four hours and used the pre-shift hours for sleep, which Chironian physiology apparently processed in more concentrated and reliable ways than Terran physiology managed. She went up the corridor without looking back, the way Chironians moved through spaces — purposefully, without the self-consciousness about movement that Terrans still carried from a lifetime of navigating social hierarchies.

Colman stood at the junction for a moment, thinking about the question she’d asked herself. Then he went back to Level Four and found Alex still awake and looking at his stars, and sat with him in the dark for a while without either of them needing to say anything about it.

Chapter 4: Alex’s World

By the third week of the voyage, Alex had established four things as the center of his existence: the star map on his display wall, Tomas, the ship’s engineering section (which Bernard allowed him to visit unsupervised, under conditions that Colman suspected were less

about supervision and more about the fact that Bernard found Alex's questions interesting), and a running argument with a Chironian girl named Saan who was six and who had decided that Alex was wrong about several things and was in the process of explaining why.

Saan's parents were both on the ship — her mother, Fen, was a biologist, and her father, Drel, was an environmental systems engineer who was responsible for the ship's atmospheric cycling. They were among the two hundred and seven Chironians who had come to see Earth. Saan had come because her parents had come and she was six and that was not yet a decision point. She had strong opinions about most things and expressed them in the direct, unhedged Chironian manner that meant it was sometimes difficult to tell the opinions from the facts.

“You said the stars don't move,” she told Alex at breakfast on day twenty-three. They were at the same table by default now — a pairing that had organized itself without adult involvement of any kind.

“They do move,” Alex said. “I said they move too slowly to see.”

“That's the same thing.”

“It isn't. If you can't see something, it doesn't mean it isn't happening. It means you can't see it.”

Saan processed this. “My father says we're moving. Not the stars.”

“We're both moving. That's the point. Everything moves, relatively.”

“Then you were right that they move.”

“Yes.”

“But you said—”

“I said they move too slowly to see, from Earth, without instruments, over a human lifetime. That’s still true.”

Tomas, who had been eating through this exchange with the patience of someone accustomed to agricultural processes that also had their own timeline, said: “Can we talk about something else?”

“What do you want to talk about?” Alex asked.

“I want to know what we’re going to find on Earth.”

This produced a silence. Alex looked at his breakfast. Saan looked at Tomas with the expression she used for questions she had already thought about.

“Broken things,” Saan said.

“How broken?” Tomas asked.

“I don’t know exactly. Very broken.”

“My parents are from Earth,” Tomas said. He said it as a fact, not as a complaint. “They think some things will still be the same.”

“Some things will be,” Alex said. “The geography. The ocean. The light.” He paused. “Things that didn’t get broken because you can’t break them. The other things—” He looked at his display wall across the room, which from this angle showed an exterior view of the ship’s own hull against deep space. “I asked my dad about it.”

“What did he say?” Tomas asked.

“He said it’s like—” Alex thought about how to translate his father’s answer into appropriate terms. “He said it’s like the difference between a house and the people who live in it. The house can be rebuilt. But the people who lived there had a specific way of being in

it, and if those people are gone, the rebuilt house isn't the same house even if it looks the same."

Tomas thought about this carefully. "Is that sad?"

"My dad thought it was. But he also said that new people in a rebuilt house eventually make it theirs and it becomes a different kind of real." Alex picked up his fork again. "He wasn't sure if that was sad or not."

Saan had been listening with the critical attention she gave to philosophical propositions. "On Chiron we don't have houses that way. We have buildings that get used for things and then used for different things."

"I know," Alex said.

"So we don't have that kind of sad."

"You might after this trip," Alex said. "You might feel something like it when you see Earth. Kath says you can't know what you'll feel until you're there."

This was the end of the conversation, practically speaking. Tomas went back to eating. Saan went back to whatever she was thinking about. Alex looked at his display wall.

The engineering section was the part of the ship Colman found most familiar — the familiar syntax of systems under load, of monitoring panels whose information meant specific things and whose meaning could be verified by direct observation, of work that had consequence and feedback. He was the second engineering officer, reporting to Bernard, with operational responsibility for the drive monitoring systems and the secondary fabrication units.

He liked the work and he liked Bernard's approach to it, which was essentially: here is what we need, here is what we have, figure out the gap. Bernard had the engineer's skepticism about organizational structure — he was perfectly capable of using rank and precedence when necessary, but found them inferior to competence as an organizational principle, and ran the engineering section accordingly. The result was a group of about thirty people, roughly half Chironian and half former Terran, who worked well together in the specific way that people work well together when they've been organized by capability rather than by hierarchy.

Linh Nguyen was the most technically capable person in the section after Bernard, which Bernard had established in the first week by the simple expedient of giving her the hardest problems and noting how she handled them. She handled them quickly and precisely, with an explanatory style that meant she taught the people around her as she worked, which was the Chironian default and which Bernard found more effective than alternatives he'd tried.

Alex came to the section on the eighteenth day and stood in the main monitoring room with both hands behind his back, which was his posture for close attention, and watched the displays for approximately twenty minutes before asking: "What do the red ones mean?"

Bernard looked up from his console. "Which red ones?"

"Those." Alex pointed to a cluster of pressure monitoring indicators on the secondary coolant system. Three of them were showing amber, not red.

"Amber," Bernard said. "That means within tolerance but approaching the attention threshold."

"What's the attention threshold?"

"The level at which a deviation becomes worth investigating."

“Why isn’t it worth investigating now?”

Bernard looked at the instruments. “Technically, everything is always worth investigating. Practically, you have limited attention and you have to allocate it where it will have the most effect. The amber indicators are telling me the system is stable but should be checked more frequently than usual.”

“How do you decide what to investigate first?”

“Experience, mostly. Pattern recognition.” Bernard turned in his chair to face Alex properly. “What you’re learning to do is to look at a large number of data points and identify the one that has unusual behavior, and then understand whether the unusual behavior is noise or signal.”

“What’s the difference?”

“Noise is deviation that doesn’t predict anything. Signal is deviation that tells you something about the state of the system.” He looked at the amber indicators again. “Those are probably noise. Cooling cycle variation, nothing more. But I’ll check them in an hour.”

“Can I come?”

Bernard considered this for a moment. “Yes. But you don’t touch anything.”

“I know.” Alex looked at the displays with the focused interest of someone cataloging. “My dad says you can read systems the way some people read faces.”

“Your dad is being generous.”

“He says it like it’s a compliment.”

“It is a compliment,” Bernard said. “It’s just not accurate. I can read systems I’ve worked with for a long time. New systems are opaque to me until I’ve spent time with them. Reading a face works similarly — it’s not a mystical ability, it’s familiarity. You know the baseline, so you can read the deviation.” He looked at the boy. “You already understand that, I think.”

“I understand the idea.”

“The idea is most of it. The practice just takes time.”

Alex nodded, still looking at the displays. “Bernard. What’s Earth going to need from us?”

This was the question that had been in the section for three weeks without being directly asked. Several of the engineers near enough to hear it stopped pretending not to listen.

“That depends entirely on what we find,” Bernard said. “We have a set of resources — the fabricators, the power systems, the medical equipment — that could address almost any material deficit. What we don’t know is whether the material deficit is the binding constraint.”

“What if it isn’t?”

“Then the resource question becomes secondary and the social question becomes primary. And social questions are harder than resource questions, because they don’t have specifications.”

“What are social questions?”

“Who controls what. Who trusts whom. Who has authority and why. Whether the people who have authority deserve it by any standard other than the fact that they currently have it.” Bernard paused. “These are the questions that destroyed Earth, more or less. And they’ll still be there, seven years after the destruction.”

Alex was quiet for a moment. Then: “Dad was a soldier on the Mayflower II.”

“Yes.”

“Did he have authority?”

“A certain kind. Over the people in his unit.”

“Did he deserve it?”

Bernard looked at the boy, who was asking a genuine question rather than a rhetorical one. “Yes. He earned it. That’s the distinction — authority that’s earned is different from authority that’s claimed. The system on the Mayflower II didn’t always make that distinction clearly. On Chiron, it’s not a distinction that needs to be made explicitly, because no one claims authority they haven’t earned. On Earth—” He shook his head slightly. “On Earth the question is more complicated.”

“Because they’ve been surviving.”

“Yes. Because when you’re surviving, you take the authority that’s available. You don’t wait for the right kind.”

Alex looked at the displays. The amber indicators were still amber. “Dad says some of the people who kept others alive probably did things that weren’t—” He searched for the word. “That weren’t clean.”

“Very likely,” Bernard said.

“Does that mean they were wrong?”

“It means the question of whether they were wrong is more complicated than it looks,” Bernard said. “And that’s the kind of question we’re going to have to sit with for the entire time we’re at

Earth. Without resolving it cleanly, because it doesn't have a clean resolution."

This seemed to satisfy Alex in a way that dissatisfied him, which Colman, listening from the adjacent corridor with his coffee, recognized as a sensation he knew from experience. The question that opens more questions. The answer that makes you less certain than you were when you started.

He stepped into the monitoring room. Alex looked up at him.

"Hi," Alex said.

"Hi." Colman looked at the amber indicators. "Coolant variance?"

"Probably," Bernard said. "I'll check in an hour. Alex is coming with me."

Colman looked at his son and then at Bernard and then at the displays, and felt the specific, ordinary satisfaction of people who trust each other in useful spaces doing useful work. "Good," he said. "I'll be in the secondary drive room if you need me."

He went. The amber indicators were, in fact, coolant cycle variance. But checking them was still worth doing.

PART TWO: THE DEEP

Chapter 5: Year One

The first year of the voyage reorganized itself into the shape that long voyages take: an initial period of novelty followed by the consolidation of routine, followed by the deeper settling that occurs when routine has been long enough to stop feeling like imposition and starts feeling like preference.

The Chironians adapted first and fastest, which had more to do with their constitution than with any particular capability. They had not grown up with the nervous habit of filling time. Idle time on Chiron was simply time — not a reproach, not a failure, not evidence of laziness. It was time, available for whatever its occupant found interesting. On a ship in deep space, this meant that the Chironians settled quickly into patterns of inquiry and conversation and work that were indistinguishable from how they lived at home, simply translated to a smaller scale.

The former Terrans took longer, for reasons that were easy to understand. They had been raised in a world where time not spent productively was time spent guiltily, and the anxiety around idleness did not disappear simply because the conditions that had reinforced it were no longer present. Several of them had found the transition to Chironian life challenging even in five years on Chiron; six years in a ship was a more concentrated version of the same challenge, without the escape valve of the planet's size.

Lechat managed this with his characteristic light-touch attention. He noticed the people who were struggling without making a display of noticing, and arranged for them to be involved in activities that were genuinely necessary rather than invented to give them occupation,

which the Chironians would have seen through immediately and which some of the former Terrans would have found infantilizing. The distinction he drew — real work, freely chosen — was slightly invisible from the outside, which was the point.

Bernard's engineering section was the nucleus of the voyage's practical work, and it attracted a mix of people whose common element was interest in how the ship functioned. The mix worked better than Colman had anticipated: Chironian engineers had a facility with materials and systems that was impressive; former Terran engineers had a different but complementary approach that tended toward the analytical rather than the intuitive. The combination produced a section that was better at its work than either group would have been alone.

Colman's own role sat at the intersection of engineering and the more ambiguous work of monitoring the ship's human systems. This was a phrase Bernard had used in one of the early planning meetings — human systems — and Colman had been slightly surprised to find it on a technical agenda, and less surprised when Bernard explained what he meant: the systems of trust and communication and role clarity that determined whether the people on the ship would function as a coherent unit or as three hundred and fifty individuals competing for resources and attention.

“Human systems don't have specifications,” Bernard had said, with the particular precision of someone who had thought about this. “They have histories. What makes them work is the same thing that makes any complex system work: clear feedback loops, distributed competence, and a shared model of what good performance looks like.”

“You're describing culture,” Colman said.

“Yes. Dressed in engineering language because the engineering language is more useful for identifying failures.”

The ship's culture was, in practice, Chironian by default. The Chironians were the majority, and more importantly, they were the people most comfortable with extended periods of close habitation in complex spaces — they'd been doing it in one form or another since their civilization began. The former Terrans generally found, after initial resistance, that the Chironian defaults were comfortable: no hierarchy without competence, no authority without knowledge, no exclusion except from things you hadn't learned yet.

There were frictions. They were predictable and mostly minor, and Lechat's light-touch approach usually made them legible before they became structural.

The larger debates were better. Colman had been on ships before and knew that the quality of the debates a crew could sustain was a fair proxy for the crew's intellectual health. The debates on the Congreve, in the common areas on Level Two in the evenings, were very good.

The debate that defined the first year was not about Earth, directly, but about scarcity.

It started in the third month, when a former Terran woman named Rashida who had been a political economist on the Mayflower II and who had spent the intervening years teaching at the Franklin university, offered the proposition that the Chironian model was not replicable.

“Not as a practical matter,” she said. She was talking to a group of six people in the Level Two common area after dinner — three Chironians, two former Terrans, and Lechat, who had joined the conversation partway through with the expression of a man who has found something worth listening to. “I'm not saying it's wrong. I'm saying it's a product of specific historical conditions that cannot be reproduced deliberately. You had a blank slate. No prior conditioning, no inherited power structures, no vested interests. The

AI raised children who were genuinely free of the cultural inheritance that has shaped every human civilization since the Neolithic.” She paused. “You can’t deliberately create a blank slate. It requires the specific combination of AI caretaking and total isolation that produced Chiron.”

“Why does it require a blank slate?” Saan’s father Drel asked. He was part of the Chironian three in the group and had the precise, technical way of asking questions that suggested he already knew the answer would be inadequate.

“Because the alternative — teaching adults to abandon their conditioning — doesn’t work,” Rashida said. “Adults can intellectually understand the Chironian model. They can agree it’s better. They can choose to live by its principles. But the underlying conditioning — the reflex to compete for scarce resources, the hierarchy-building instinct, the zero-sum thinking — those don’t go away with intellectual agreement. They’re in the deep structure.”

“Steve Colman abandoned his conditioning,” Drel said. “Most of D Company did.”

“Colman is— Colman had unusual formation,” Rashida said, with a glance at Colman that was apologetic and accurate. “D Company were outliers within their own culture. The systematic non-conformists, the people who never fully accepted the conditioning in the first place.”

“Earth will have produced similar people,” Drel said. “Eleven years of crisis produces its own selection pressure. Some people survive by conforming to the prevailing hierarchy. Some survive by being more flexible.”

“And your contention is that the flexible survivors are the ones who can be reached?”

“I’m not making a contention about probability,” Drel said. “I’m observing that the assumption of universal intractability is as unfounded as the assumption of universal tractability.”

Lechat said: “The question of what we can realistically achieve shapes everything about how we approach Earth. If the Chironian model is entirely non-transferable, we’re essentially there to provide material aid and leave. If it’s partially transferable, even to a small fraction of the population, we have a different kind of mission.”

“In what way different?” Rashida asked.

“In the way that involves staying longer. Doing more.” He paused. “Being more invested in outcomes.”

“Is that what we want?”

“That’s what I want to figure out before we arrive,” Lechat said.

Colman had been listening. He said: “The debate is slightly misframed.”

Several people looked at him. He had been quiet for most of the evening, which was his default at large discussions — he tended to wait until he had something specific to add.

“The question of whether the Chironian model is transferable to adults with prior conditioning is an interesting theoretical question,” he said. “But it’s not the practical question. The practical question is whether the specific people we find in specific places can be engaged in specific ways that move them toward the principles, even if the full model isn’t achievable. You don’t need universal transfer. You need partial transfer in enough people and places that it becomes a new equilibrium.”

“How partial?” Rashida asked.

“Partial enough that the people who can’t make the transfer are no longer the dominant faction.” He paused. “That’s how it worked on Chiron, after all. Sterm couldn’t be transferred. Neither could Kalens, in the end. But there were enough people who could — including from D Company — that the intractable remnant became isolated rather than central.”

Rashida thought about this. “And you think Earth will have an equivalent dynamic.”

“I think Earth has whatever it has. The point is to look for it.”

By the sixth month, the children had organized themselves.

This was not a formal organization — there was no charter, no elected leadership, no agreed name. It was the self-organization of nine children between the ages of four and twelve who had spent enough time sharing spaces to develop a set of operating conventions that functioned better than most adult organizations.

Alex was one of its informal centers, not because he was the oldest (he wasn’t — a Chironian boy named Arav was twelve and had the relaxed authority of someone who had never needed to prove his authority) but because he was reliably interesting. He generated questions and observations that other children found worth engaging with, and he listened to their responses in a way that made it clear he was actually revising his thinking rather than performing revision while holding his original conclusion.

Tomas was the grounding element. He had the steadiness of someone who had grown up in earth and seasons and had a reliable sense of what was practically possible. He didn’t say things that couldn’t be done, which was useful in a group that sometimes got excited about theoretically possible things.

Saan was the check on both of them. She had a specifically Chironian relationship to received wisdom — not skeptical, exactly, but demanding precision. When someone said something that was approximately true but not precisely true, she noticed and said so. This was occasionally irritating and consistently useful.

The other six children occupied various positions in this ecology. They met in the atrium most days after the shared education sessions that Lechat had organized for the ship's children — sessions that followed Chironian educational principles, which meant they were organized around questions rather than curricula and required the teachers to not know all the answers in advance.

The session that Colman observed one afternoon in the fourth month was about Earth's history. The teacher was a Chironian woman named Mira who had the relaxed authority of someone who had been teaching for thirty years and had long since stopped needing to prove she was in control of the room.

She said: "What do you know about what happened to Earth?"

The children produced, collectively, a fairly accurate summary of the historical record — the nuclear exchange, the sequence of events leading up to it, the role of the Eastern Asiatic Federation and the Western Alliance in escalating a regional conflict into a planetary one. Arav, the oldest, had clearly done the most reading. Alex had done a different kind of preparation — he had questions rather than facts.

"Did anyone know it was going to happen?" Alex asked.

"Historians argue about this," Mira said. "There are records suggesting some people predicted something like it, and there are records showing those predictions were largely ignored."

"Why were they ignored?"

“Several reasons. The people making the decisions had immediate pressures that made long-term risk harder to prioritize. There were economic and political incentives to not take the predictions seriously. There was also simple failure to imagine that the thing could actually happen.”

“How do you fail to imagine something that’s obviously possible?”

Mira looked at him with appreciation. “That’s a very good question. Do you have a theory?”

Alex thought about it with his characteristic seriousness. “I think maybe... if admitting something is possible means you have to do something about it, and doing something about it is hard or costs you something, then maybe you don’t admit it’s possible.”

“Yes,” Mira said. “That’s most of it.”

Tomas raised his hand — he had Earth-schooling instincts that hadn’t entirely disappeared. “Can we just not talk to people like that when we get there? Not pretend things aren’t possible?”

“We can try,” Mira said. “The challenge is that the people we find may still be in the dynamic Alex described — may still have things they’re not admitting are possible, because admitting them requires changes they’re not ready to make.”

“So what do we do about it?” Tomas asked.

“We demonstrate the alternative,” Mira said. “Not by talking about it. By being an example of a different way.”

Saan said: “That’s what my mother says. She says you can’t argue someone into seeing differently. You can only be different in front of them and wait.”

“Your mother is right,” Mira said.

Alex was looking at the ceiling in the way he did when he was assembling pieces. “But you have to be there long enough for the waiting to work,” he said.

“Yes.”

“And we’re not staying.”

“We’re staying for a while,” Mira said. “And some of us are staying longer.”

Alex looked at her. “Who?”

This was the first mention, in the children’s world, of the people who would stay. Mira looked at Colman, who was standing at the back of the room. He gave her no particular guidance with the look.

“That’s still being decided,” she said. “But some people will stay on Earth after the ship leaves.”

“Why would someone stay?” Tomas asked.

“Because some work takes longer than a visit,” Mira said.

Chapter 6: Linh

Linh Nguyen had a habit Colman noticed in the second month of the voyage: she would finish her engineering shift and instead of going to her quarters, she would go to the ship’s library — a room on Level Two that had been designed as an archive and media center and that was, at most hours, occupied by two or three people in the comfortable silence of people doing independent work.

She would sit at one of the back tables and read. She was not reading technical material — Colman verified this once with a glance that he took care to make casual. She was reading history.

Specifically, she was reading the archived records of the Eastern Asiatic Federation's activities in the decades before the war.

He didn't ask her about this. The asking would have been an intrusion on something she was clearly processing privately, and Colman's instinct — developed through eleven years of living among people who respected the difference between public and private — was to wait until the information was offered.

She offered it in the fourth month, over dinner.

"My grandfather," she said, without preamble. They were at a corner table in the main mess, which at this hour was half-populated and had enough ambient conversation to approximate privacy. "He was a regional administrator in the EAF agricultural authority. He managed food distribution for a population of about three million people in the delta region."

"How did he manage it?" Colman asked. He meant: which way. Not what methods.

"He was honest," she said. "He maintained accurate records. He didn't personally divert resources. By the standards of the EAF's administrative system, he was a good official." She paused. "By any other standard, he was part of a system that produced the resource scarcity that the EAF used as the justification for its expansionist policy."

"He didn't create the policy."

"No. He didn't create it and he didn't oppose it and he didn't do anything that made it harder to maintain. He was the mechanism. The system ran through him." She looked at her food. "He's dead now. Has been for twenty years. He died before I was born. I never knew him. What I know about him is from the records my mother kept — not the official ones, the personal ones."

“What do the personal records say?”

“That he was a careful man who thought carefully about what he was responsible for and concluded, carefully, that his responsibility was to the people in his region rather than to the system he served.”

“Was he right?”

“He was sincere.” She picked up her fork. “He thought that doing his job well — keeping accurate records, maintaining equitable distribution within the bounds the system allowed — was the maximum good available to him. He wasn’t wrong about the maximum available. He was wrong to not ask why the bounds existed.”

Colman thought about this. “He didn’t ask whether the system was worth serving.”

“He asked whether he could serve it well, which is a different question and one that has much more comfortable answers.” She ate for a moment. “The EAF sent a starship to Alpha Centauri. They intended to colonize it. They chose their best people — scientists, engineers, administrators, soldiers — and sent them out with the intention of planting a new version of the system out there. A new frontier for the expansion to expand into.”

“It didn’t work that way.”

“It didn’t work that way,” she agreed. “Because by the time they got here, Chiron already existed, and Chiron had different physics.” She was quiet for a moment. “But if it had worked the way they intended — if they’d arrived at an empty planet and built another EAF system — then my grandfather’s careful, sincere, comfortable mistake would have been transmitted across twelve light-years.”

“Instead they became Chironians,” Colman said.

“All of them. Within two years, apparently, by the records. The system they’d been embedded in simply had no environment to grow in.” She looked at him. “Which is the argument for the Chironian model as the universal solvent. You just have to get people to an environment where the old system can’t function, and the old system stops functioning.”

“But we can’t move Earth’s survivors to Chiron,” Colman said.

“No.” She returned to her food. “So the question is whether you can move something like Chiron’s conditions to Earth. Or create enough of a pocket of it that it starts to spread.” She paused. “I have a specific stake in this question. If it turns out the EAF-descended people on Earth are the ones who can’t be reached — who are the most embedded in the hierarchies that formed after the war — then I have information that’s relevant to how we approach them.”

“What information?”

“That sincerity about serving the system well is not the same as alignment with the system’s goals. There are people who believe in their role without believing in the larger purpose, and those people are reachable in ways that committed ideologues are not.” She paused. “My grandfather would have become Chironian. I’m certain of it. He would have seen the model and understood immediately why it was better, and he would have revised accordingly.”

“How do you know?”

“Because he spent his career minimizing harm within a harmful system. When you’re doing that — when you’re the good person trying to do good within a bad structure — and you see a structure that doesn’t require the minimization, you feel relief. Not threat. Relief.” She looked at him steadily. “The people who feel threatened by what we are — they’re the ones who needed the structure for something other than productivity. They needed it for identity. For position. For the power it gave them over others.”

“And those are the ones who can’t be reached.”

“Those are the ones who will resist hardest. Yes.” She picked up her cup. “But even some of them — the self-aware ones — might be reachable. When someone knows exactly what they did and why, and can look at it honestly—” She paused. “That honesty is a place to start.”

Kath had joined them partway through without Colman noticing, which was a thing Kath could do in social situations without it being a surprise. She sat down with her tea and said nothing for a moment, which was her way of signaling she’d heard enough to be in the conversation.

“You’re thinking about Chen Yi-jun,” Kath said to Linh.

Linh looked at her. “You know about him?”

“The Mountain State transmissions started about three years before we left Chiron. Very tight, very disciplined. Someone was managing those very carefully.” Kath wrapped her hands around her cup. “He’s kept six hundred thousand people alive in the US mountain west. The signals suggest a command economy of unusual efficiency.”

“What kind of unusual?” Colman asked.

“The kind that produces no waste. No corruption in the distribution records. Completely uniform allocation of scarce resources across the population.” Kath looked at her tea. “Either the records are falsified, or someone is running that system with a level of personal integrity that is, by any historical standard, extraordinary.”

“Or,” Linh said, “someone with unusual intelligence and strong personal commitment is doing what my grandfather did. Believing in the role rather than the system.”

“Yes,” Kath said. “That.”

“He could be very dangerous,” Colman said.

“He’s the most interesting person we’re going to meet,” Kath said.

The argument between Linh and Rashida that happened in the sixth month was the most useful argument of the voyage’s first year, which was saying something, as the Congreve’s passenger list was unusually good at productive argument.

It started over a technical question — the specifics of the fabricator distribution plan for the Earth contact phase — and expanded into the underlying question about capability and responsibility.

“We’re going to arrive,” Rashida said, “with technology that is, by Earth’s post-war standards, so advanced it will appear essentially magical. The fabricators can produce food, medicine, complex components, power sources, from ambient materials in hours. From the perspective of someone who’s been rationing calories for eleven years, this is not a technical capability. It’s a moral claim.”

“How do you mean a moral claim?” Linh asked.

“The possession of extreme surplus, arriving at extreme scarcity, creates an obligation. If I have everything and you have nothing, and I sit on my surplus rather than sharing it, I’m making a moral choice. The technology makes that choice unavoidable and visible. There’s no neutral position.”

“Agreed,” Linh said. “But the form of the sharing is the entire question. If we give, we’re recreating the dependency structures that produced the vulnerability in the first place. Aid creates its own hierarchy — the giver above the receiver, permanently.”

“Teach, then.”

“But teaching requires the student to want to learn, and the student has to not be starving while they learn.” Linh paused. “The logistics are intractable at scale. For a hundred people, you can maybe thread the needle between aid and teaching. For four million people in the Southern Reach—”

“We’re not feeding four million people from the ship,” Colman said. “The fabricators can produce components that allow local populations to build their own manufacturing capacity. That’s different from feeding them directly.”

“Only if they use the components for that,” Rashida said.

“What else would they use them for?”

“Weapons,” said a Chironian man named Juren who had been quiet until now. He had the specific Chironian quality of entering a conversation at the most productive moment and saying the thing everyone was avoiding. “If they’ve been fighting over resources for eleven years, the people who get the fabricators first will make weapons. To defend what they have from the people who don’t have it.”

A silence fell over the group.

“That’s a significant practical constraint,” Lechat said. He had been listening from a chair near the edge of the group.

“Yes,” Juren said. “The fabricators should be designed to be incapable of producing weapons.”

“They already are,” Bernard said. He had appeared in the doorway at some point. Colman had long since stopped being surprised by Bernard’s ability to arrive at conversations he was needed at. “The specifications don’t include anything that can be directly weaponized. They can produce tools that can be misused, the way

any tool can be misused. But they can't produce firearms, explosives, directed energy weapons, or anything of that class."

"People will figure out the workarounds," Rashida said.

"Some will," Bernard agreed. "We can't prevent all misuse. We can make the direct applications so much more convenient that misuse requires significant additional effort."

"How significant?"

"Enough that most people will find it not worth the effort."

Rashida didn't look entirely satisfied by this, but Lechat was nodding with the expression of someone crossing an item off a list. The fabricators were already locked. That problem was solved; the next one was the one that wasn't.

"The one we haven't addressed," Colman said, "is what happens when we leave. We install the fabricators, show the people how to use them, leave some Chironians to assist in the transition, and then depart. Six months to two years later, we come back to check on things. What does the check find?"

"We don't know," Kath said.

"Specifically what we don't know?"

"Whether the free access model holds once we're not there to model it. On Chiron, the free access is self-reinforcing — because everyone uses it, it seems natural, and no one has an incentive to restrict it because there's nothing to gain from restriction. On Earth—"

"On Earth there will be a faction that tries to control the fabricators," Juren said. "From the first day."

"And our local volunteers will need to manage that."

“Yes.”

“Do they know what they’re signing up for?”

Kath looked at him with an expression that carried, somewhere inside its calm exterior, something that Colman recognized as the particular Chironian form of sadness — not the performed sadness of the Earth tradition, but the accurate, precise recognition of a difficulty without accompanying self-pity. “They know. They’re going anyway.”

Chapter 7: Year Three

Alex at seven was systematically dismantling the assumptions of every adult on the ship, one carefully considered question at a time.

It was not malicious and it was not theatrical. He was simply curious in a way that had no stopping mechanism. Colman had come to think of it as a particular kind of engineering — Alex was testing the load-bearing elements of every belief system he encountered, not to destroy them but to understand exactly what they were supporting and whether the support was genuine.

His targets were not random. He had an instinct for the questions that other people had agreed not to ask, which was a useful skill and a socially disruptive one.

The question he asked the former-Terran contingent in the eighth month of year three was the one Colman should have anticipated.

He had been in the Level Two common area with a group of four adults — two former Terrans, one Chironian, and Rashida, who was a permanent fixture in any large discussion — when he had apparently been sitting quietly in a corner working on something and had looked up and said, into a lull in the conversation:

“Did anyone on the Mayflower II know a war was coming?”

A pause.

“Why do you ask that?” one of the former Terrans — a man named Pak — said.

“Because you were in space for twenty years. You would have had time to monitor Earth’s transmissions. And the war happened six years after you arrived.” He looked at Pak with his direct, undramatic curiosity. “Were there signs?”

“There were—” Pak stopped. He was fifty-seven now, a former logistics officer who had adapted to Chiron more slowly and more completely than most, and who had the particular quality of someone who had examined the past carefully and was no longer entirely comfortable with what he found there. “There were tensions. The EAF-Western Alliance conflict had been escalating for years.”

“Did anyone say it was going to happen?”

“People speculated.”

“Did anyone take the speculation seriously?”

Another pause. Rashida was watching Alex with the attentive expression she used when a student asked a question she hadn’t anticipated.

“Probably not seriously enough,” Pak said.

“Why not?”

“Because—” Pak looked at his hands. “Because taking it seriously would have meant acting differently. Changing our relationship with what we’d left. And most of us had already decided to be here, and being here meant a certain... detachment from what was back there.”

“You didn’t want to know.”

“Some of us didn’t want to know,” Pak said, with the precision of a man being honest about something he has been carrying for a while. “It’s not the same as choosing not to know. It’s more like—” He searched. “Like not looking in a direction you didn’t want to see.”

Alex considered this. “If you’d looked, would it have changed anything?”

“I don’t know. Probably not. We didn’t have the kind of communications capability to do much from eleven light-years away.” He paused. “But maybe—”

“Maybe you would have been less surprised,” Alex said.

“Maybe.”

“And maybe less surprised means you thought about what to do more in advance,” Alex said. “Like now.”

Pak looked at him for a long moment. “Yes,” he said. “Like now.”

The conversation continued for another hour, moving through the specific mechanics of the Earth transmissions in the years before the silence — what had been received, what had been understood, what had been filed and not acted on. It was not comfortable. Colman, who had come in partway through and taken a seat near the door, thought it was probably the most useful conversation the former Terrans on the ship had had so far.

Alex listened more than he spoke. He had asked the question that opened the door; he wasn’t trying to walk through it himself, just making sure it was open for the people who needed it.

This was, Colman reflected, a very Chironian way of doing things. It was also very Alex, which was a distinct and specific thing.

The year-three milestone was marked on the ship by a gathering that had become an informal tradition: a shared dinner in the atrium, all three hundred and fifty-one of them, with the external camera feeds on the large displays showing the star field at their current position — Alpha Centauri a bright star behind them, Sol a star in front of them that was distinguishable from everything else only by position.

Lechat made a brief address. It was brief in the way his addresses were always brief — concise but not abbreviated, saying exactly what was needed and stopping cleanly.

“Three years out,” he said, “and I want to observe something that has struck me about this voyage. We came with three distinct groups — Chironian-born, Chironian-adopted, and those going home. Three years in, the groups are less distinct. Not because anyone has changed who they are, but because we’ve been in close enough contact for long enough that we’ve become interested in each other.” He paused. “Interest is the prerequisite. Not agreement, not shared values — though those develop — but interest. The willingness to find another person’s perspective genuinely informative rather than merely different.” He looked around the atrium. “I want to note that this is not guaranteed. It could have gone differently. The conditions were right and we made something with them.”

There was a kind of acknowledgment — not applause, which would have been Terran, but a collective sound that meant recognition. Several Chironians nodded. Several former Terrans had expressions that were hard to read but were not unhappy.

After the dinner, Colman found Bernard at one of the edge tables with a cup of something and his tablet.

“Three years,” Colman said.

“Slightly over,” Bernard said. “Two point nine, actually.”

“Slight distinction.”

“It’s the kind of slight distinction that keeps engineering honest.” He set the tablet down. “The secondary drive systems are running slightly better than spec. The fabricators are at full operational standard. The children are approximately one year ahead of their nominal development schedule by every measure that’s measurable.”

“Every measure that’s measurable is not all the measures,” Colman said.

“Correct,” Bernard agreed. “The ones that aren’t measurable are the interesting ones.” He looked toward the atrium where Alex and Tomas and Saan and the others were having a separate, clearly animated conversation. “What is he like?” Bernard asked. “When you’re alone with him.”

Colman considered. “He’s very quiet,” he said. “He asks questions constantly when he’s around other people. When he’s with just Kath and me, he mostly listens. Processes.”

“And what do you talk about?”

“Systems,” Colman said. “Not always technical systems. Social ones. Political ones. How things work and what happens when they stop working and how you tell the difference between something that’s failing and something that’s changing.”

“He’s nine.”

“He’s nine and he’s grown up on a ship full of three hundred and fifty adults who have spent three years talking about exactly those questions.” Colman looked at his son across the room. “He’s been marinating in it.”

Bernard was quiet for a moment. “He’s going to have an interesting time on Earth.”

“He is,” Colman said.

“Are you prepared for that?”

Colman thought about what he meant. “You mean am I prepared for him to encounter things that will—”

“I mean are you prepared for the things he encounters to change him in ways you can’t anticipate.”

“That’s parenting in general.”

“This is parenting in general in a post-holocaust environment with significant political complexity,” Bernard said. “With some additional features.”

“I’m aware of the features,” Colman said. “He’s going to be fine.”

“I don’t doubt it,” Bernard said. “I was asking about you.”

Colman was quiet for a moment. He had a clear answer, and the clear answer was: no. Not entirely. There was a specific fear — not for Alex’s safety, which was a solvable problem, but for Alex’s understanding, which was not. He would see Earth and it would mean something to him that it didn’t mean to his Chironian friends, because Colman was in him and Colman had come from there, from that specific planetary civilization with its specific mixture of beauty and catastrophic failure, and whatever Earth had become after the catastrophe, it was still where Colman was from.

The weight of that inheritance was not a thing you could explain to someone who didn’t feel it.

“I’ll manage,” Colman said.

Bernard looked at him with the expression he used when someone gave him an answer that was true but incomplete. “I know you will,”

he said. “That’s not quite what I asked.”

Chapter 8: Something Wrong with the Silence

The signal analysis room was a small space on Level One, adjacent to the communications array control, with six monitor stations and a constant low hum from the antenna arrays tracking their programmed targets. Colman came there in the evenings sometimes when he couldn’t sleep, which was not a frequent problem but was an occasional one in year four of the voyage, and he found the quality of the space conducive to the kind of thinking that resisted the more comfortable common areas.

The instruments showed, through most of year three, exactly what they had expected: deep-space background, solar wind patterns from Alpha Centauri behind them and the expected solar wind boundaries ahead as they approached the sun’s heliosphere, and silence from Earth’s direction.

The silence from Earth was itself a data point. The absence of organized radio transmission across the frequencies where organized human civilization broadcast was consistent with either total extinction or sufficiently catastrophic disruption of the industrial infrastructure that maintained long-range communication. They had expected the silence. They had discussed it, analyzed its implications, built plans around it.

What they had not expected was what appeared in month six of year four.

Colman was in the analysis room at what would have been two in the morning, ship-time. The analysis system was running its continuous scan of the radio spectrum ahead of their path when an anomaly flag appeared on the secondary screen.

He looked at it. The flag indicated a repeating signal at 437 megahertz — a frequency that was not, technically, natural. Not the kind of frequency at which a star generated noise, not the kind of frequency at which interstellar hydrogen generated background. It was in the range of frequencies used by Earth's pre-war satellite systems for specific kinds of telemetry.

He ran the analysis again. The signal was real. It was intermittent — appearing approximately every forty-seven minutes at irregular intervals within that window, suggesting an automated system on a power-saver cycle rather than a continuous broadcast.

He sat with it for twenty minutes before he woke Bernard.

Bernard came to the signal analysis room in fourteen minutes, which was eleven minutes faster than his personal best for being woken from sleep and arriving somewhere in a functional state. He looked at the display for a long time without speaking.

“What's the distance-adjusted origin point?” he asked.

“Solar orbit,” Linh said. She had arrived seven minutes earlier and had already run the back-calculation. “Somewhere between one and two AU. The signal's too weak to resolve precisely at this distance.”

“So inside Earth orbit, possibly, or at Earth orbit, or just beyond.”

“Yes.”

“Not from the surface.”

“No. Or if from the surface, boosted by a relay system in orbit. The signal profile is consistent with a satellite or station in medium Earth orbit.”

Bernard sat down. “How many pre-war satellites were in orbit?”

“Thousands,” Linh said. “Most of them would have been destroyed or degraded in the war, but some would have been in orbits not directly affected by debris events or EMP damage.”

“What kind of satellite would still be functioning after seven years?”

“Military deep-orbit systems. A few scientific platforms that were in highly elliptical orbits and might have missed the worst of the debris environment.” She paused. “Or a manually maintained system.”

“Someone repaired a satellite,” Colman said.

“Or maintained one,” Linh said. “Or built one.”

Bernard looked at the display. The anomaly flag sat there, intermittent but consistent, 437 megahertz, repeating pattern.

“What’s it saying?”

“That’s the interesting part,” Linh said. She brought up the decoded signal on the adjacent screen. “It’s a modified EAF military telemetry format. Standard header, compressed data package, timestamp.”

“What’s in the data package?”

“We can’t read it fully. It’s encrypted using a military key format we don’t have the cipher for. But the header is readable.” She brought it up. The header showed a timestamp, an origination code, and three lines of plain-text status.

*OBSERVATION PLATFORM SEVEN-ALPHA STATUS: NOMINAL
CYCLE: 4,104*

“Cycle forty-one hundred and four,” Bernard said. “If each cycle is one standard day—”

“Eleven point two years,” Linh said. “Consistent with continuous operation from before the war.”

Bernard sat back. “Someone has been running an observation platform in Earth orbit for eleven years.”

“Or a fully automated system running on its last power reserves,” Colman said. “We shouldn’t assume human agency until we have evidence.”

“The signal is modified from the standard EAF format,” Linh said. “The modification is minor — a change to the cycle counter format that’s not in the pre-war specifications. Standard automated systems don’t self-modify their communications protocols.”

“Which implies human modification at some point in the eleven years,” Colman said.

“Yes.”

The three of them looked at the display. The anomaly flag blinked steadily.

“Who knows about this?” Bernard asked.

“You two and me,” Colman said. “I woke Bernard first.”

“Lechat needs to know.”

“In the morning,” Colman said. “I wanted to be sure it was real before waking him.”

“It’s real,” Bernard said. He had the specific expression of someone whose model of the situation has just required significant revision. “It’s very real, and it changes several things about what we thought we were approaching.” He paused. “The question is who’s watching from up there, and what they can see, and whether they know we’re coming.”

“At our current signal emission levels, someone with a functional observation platform in Earth orbit has known we’re coming for approximately three years,” Linh said.

“Three years to prepare for our arrival,” Colman said.

“Three years to decide what to do about us,” Bernard said.

Chapter 9: The Debate

Lechat received the information about Observation Platform Seven-Alpha in the same way he received most significant information: with a period of silence followed by a series of precise questions, each of which identified a specific gap in the current model, followed by a considered statement of implications.

The questions took twenty minutes. The statement of implications took three minutes and was complete.

“The assumption we have been operating under,” he said, “is that we are arriving at a recovering civilization with an information deficit about our approach. The corrected assumption is that someone has been observing our approach for approximately three years, has had time to analyze our capabilities and intentions as far as they can determine them, and is either already in communication with surface communities or capable of being.”

“The third possibility,” Colman said, “is that Observation Platform Seven-Alpha is an automated system that has been running without human oversight for its entire operational life, and the signal modification was programmed before the war for reasons unrelated to us.”

“What probability do you assign to that?”

“Ten percent. The signal modification is too specific and too recent — the timestamp shows the modification was made approximately fourteen months ago, well into the post-war period.”

“Then we have, with approximately ninety percent confidence, a human actor with a three-year view of our approach and an observation platform we didn’t know existed.” Lechat looked at his hands. “The mission parameters need to be updated.”

“The mission parameters need to be updated,” agreed a voice that none of them had expected.

They were in Lechat’s cabin, which was a small private space that Lechat had converted from its original purpose as an executive suite into something that was functionally identical to any other senior crew cabin except for a small bookshelf that showed his reading preferences and a framed photograph of the Chironian coast that showed Celia’s sensibility in its composition.

The voice had come from the communications panel. The comms officer on duty, a Chironian woman named Sera, had apparently patched someone through without announcement.

“Who is this?” Lechat said.

“Kath,” said the communications panel.

They looked at each other.

“You were monitoring the signal analysis room,” Colman said.

“No,” Kath said. “I was in it. I was there when Steve found the signal. I went back to sleep afterward, but I wanted to be in this conversation.” A pause. “The mission parameters don’t need to be updated. They need to be acknowledged.”

“Acknowledged,” Lechat said.

“The parameters have always included the possibility of unexpected actors, including state-level actors with significantly greater post-war capability than the baseline assumption. The Chironian planning team that worked the Earth contact scenarios three years ago modeled this specific type — a hidden institutional actor with long-term resources, an observation capability, and a strategic interest in the mission.”

“The Chironian planning team modeled this and didn’t include it in the mission briefing documents,” Lechat said. His voice was very controlled.

“The mission briefing documents include every scenario we knew how to present clearly enough to be useful. The scenarios that depend on contact with specific actors can only be presented clearly after we know who the actors are.” A slight pause. “The planning team is on the ship, Lechat. They’re not withholding information. They’re waiting for the information to be concrete enough to act on.”

“And now it is?”

“Getting there.” Another pause. “The observation platform is probably associated with the Mountain State.”

“How do you know about the Mountain State?” Colman asked. “We’ve never discussed it directly.”

“The Mountain State transmissions started approximately six years ago,” Kath said. “The Chironian observatory at Franklin picked them up on Earth-directed antennas. We didn’t have content — the encryption is good — but the transmission profile is consistent with a centralized state-level communications infrastructure. Not a tribal authority. Not a scattered survival community. An organization with the discipline to maintain communications security.” She paused. “And the sophistication to maintain a satellite.”

“Who runs it?” Lechat asked.

“The best guess is an EAF military remnant. The transmission protocols are EAF-derived. The signal modifications on the satellite are consistent with someone who knows the original system well enough to improve it without breaking it.” Another pause. “Chen Yi-jun. Former General, EAF’s Mountain Command. He was stationed in Colorado at the time of the exchange. He had the largest surviving military force in North America and significant pre-positioned resources.”

“How long have you known this?”

“I’ve had a working hypothesis for about eighteen months. The satellite data confirms it.”

Lechat was quiet for a long moment. The cabin was very still. Colman watched him absorb the information — the revision of assumptions, the new model assembling itself, the consequent adjustments to everything downstream.

“What I want to know,” Bernard said, “is whether the plan accounts for this.”

“The plan accounts for it,” Kath said.

“The plan that wasn’t in the briefing documents,” Lechat said.

“Yes.” A pause that had a specific quality — not apologetic, but acknowledging. “I should have been clearer earlier about what we knew and didn’t know. The Chironian habit of not presenting information until it’s actionable is useful at home and occasionally frustrating at sea.”

“Occasionally,” Lechat said dryly.

“The principle behind the plan hasn’t changed,” Kath said. “Share everything equally, teach rather than give, leave the fabricators and the knowledge and the people who chose to stay, and go home. Chen

Yi-jun is a complicating factor because he's an unusually capable actor in an unusually strong position. He may have leverage that the other communities don't have."

"Such as the pre-war data archive," Linh said. She had been quiet through most of the conversation. She was looking at the communications panel with an expression Colman couldn't fully read.

A pause from the panel. "Yes," Kath said. "The Mountain State has had seven years to catalogue and organize whatever survived of the pre-war institutional infrastructure. The archive could be significant."

"Significant enough to change the terms of our engagement with Earth," Linh said. "If he has technical records we need — records that would accelerate Chironian development significantly—"

"Then we have a reason to deal with him specifically, which creates a preferential relationship, which contradicts the equal-distribution principle," Colman said.

"Yes," Kath said.

"And you've been thinking about this for eighteen months."

"Yes."

"And you don't have a solution."

"Not a clean one. No."

Lechat made a sound that was not quite laughter. "At least we're on the same page about the mess."

"We've been on the same page the whole time," Kath said. "The page was just in a different section."

Bernard stood up. "I'm going back to bed. We have two and a half years before any of this is actionable, and I have a ship to run, and I'd like to run it from a state of something other than four in the morning." He looked at Lechat. "You're going to be fine," he said, with the particular deadpan that was Bernard's version of warmth. "We have a satellite."

"That is not the most comforting thing you could have said," Lechat said.

"I know," Bernard said, and left.

PART THREE: ARRIVAL

Chapter 10: The Solar System

They entered the heliosphere in year five, month four, which was unremarkable physically — the heliosphere’s outer boundary was a diffuse zone rather than a line, defined by the point where solar wind pressure equaled interstellar pressure, and the only sign was a change in the particle density readings and a subtle shift in the electromagnetic background — but was significant in the way that a threshold is significant: once you’re across it, you’re in a different space.

Colman stood in the forward observation bay when they crossed and felt the specific quality of a thing he had been approaching for years finally beginning to arrive.

Alex was with him. He was ten now, with the lean, spare quality of a child who had grown up in a spaceship and had the good posture that came from living in variable-gravity environments without the compensatory slumping of gravity-born children. He was taller than average, with Kath’s coloring and Colman’s eyes and the specific expression that belonged to neither of them but only to him — concentrated, open, the look of someone for whom the world is primarily interesting.

“We’re inside it,” Alex said.

“The sun’s influence. Yes.”

“The sun’s our sun.”

“Your sun. Mine. Earth’s. Yes.”

Alex looked at the forward display. Sol was distinguishable now — brighter than any other star in the forward view, with a slight disk visible at maximum magnification. “How long until Earth?”

“At current deceleration, four months, give or take.”

“And then we stay for—”

“That depends on what we find.”

Alex nodded. He had learned to accept indefinite answers with less resistance than he’d shown in year one. The ship had taught him that some things couldn’t be specified in advance and that this was not a failure of planning but an inherent property of systems that included people.

“Dad.”

“Yes.”

“When you came from Earth, were you happy there?”

Colman thought about this with the care the question deserved.

“No. Not exactly.”

“Were you miserable?”

“Not exactly that either.” He looked at the star. “I was adapted to it. The way you adapt to an environment that has specific requirements — you become what the environment needs you to be. And that’s not happiness or misery, it’s just fit. I fit Earth.”

“And then you came to Chiron and you fit differently.”

“I learned to fit differently. It took time.”

“But now—”

“Now Chiron fits,” Colman said. “And this—” He gestured at the star field. “This is the place between. The place where you’re not from either one yet.”

Alex looked at the sun for a long time. “I’ve never been anywhere but the ship and Chiron,” he said.

“I know.”

“Everything I know about Earth is from you and the files.”

“Yes.”

“So when I see it—” He stopped. “It’s going to be the first real thing. The first thing I know about from the outside and then see from the inside.”

“Yes,” Colman said. He didn’t add that this was true for two hundred other people on the ship, and that the quality of that first seeing was going to be its own kind of event, private to each person and collectively significant.

“What should I expect?” Alex asked.

“I don’t know what’s there,” Colman said honestly.

“Not what’s there. What should I expect to feel?”

Colman looked at his son. “Complicated,” he said.

Alex considered this. “Okay,” he said. “I can do complicated.”

The mood shifted.

It was not a dramatic shift — there was no moment of collective anxiety that Colman could point to and say, here is where the tone changed. It was more gradual than that, a slow compression of the

emotional atmosphere on the ship over the weeks of approach, the way air pressure builds before a storm.

People spent more time at the forward displays. The common area conversations, which had ranged freely over the full breadth of available subjects for five years, began to concentrate on specific questions about Earth — the state of its surface, the nature of the communities that had survived, the practical logistics of what would happen when they arrived. The philosophical debates became more specific, more operational. Less about principles and more about applications.

The children noticed before the adults did, which was consistent with their pattern throughout the voyage. Alex brought it up at dinner on a Tuesday in the ninth month of year five.

“Everyone’s scared,” he said.

Kath looked up. “What makes you say that?”

“The way they sit now in the common areas. The way conversations stop when someone new comes in. The way people eat faster.” He paused. “I can see it.”

“What do you think they’re scared of?” Colman asked.

Alex thought about it. “Different things,” he said. “The Chironians are scared of what Earth will be like — whether it’s as bad as the files say. The Terran-born people are scared that what they left behind is gone. And the—” He paused. “And there are some people who are scared of what we’re going to do.”

“What do you mean?”

“Like, whether we’re going to get it right,” Alex said. “Whether what we have to give is actually going to help or whether it’s going to make things worse.”

Colman and Kath exchanged a brief look.

“That’s a reasonable thing to be scared of,” Kath said.

“I know,” Alex said. “That’s why they’re scared of it.” He picked up his fork. “I’m not scared.”

“What are you?” Colman asked.

Alex considered this seriously. “Interested,” he said. “I keep thinking about the people down there. Not as a group — as individuals. Specific people. What they’ve been doing for eleven years. How they think. What they think we are.”

“What do they think we are?”

“Probably something they need,” Alex said. “And that’s interesting but also hard, because when you’re something someone needs, they don’t really see you. They see what they need.”

Colman put down his fork.

“Where did you get that?” he said.

Alex looked up. “Mira,” he said.

“Who is Mira?”

“She was in the last batch of transmissions from the Southern Reach. There was a woman named Dr. Petrov who was interviewed for a community broadcast about the status of the medical supply. She had a daughter. The daughter was seven in the recording. Her name is Mira.” He paused. “The recording was from four years ago. She’d be eleven now.”

Colman and Kath were both looking at him.

“I’ve listened to the recording many times,” Alex said. “The mother is answering questions about medicine and the daughter is sitting next to her and you can see her thinking. Calculating. She’s working out how much medicine is left and whether it’s enough.” He looked at his plate. “That’s what I mean. That’s someone specific. That’s the person I want to understand.”

Kath said, quietly: “You found her in a background of someone else’s interview.”

“She was visible,” Alex said, as if this were obvious.

Chapter 11: First Signals

The Southern Reach transmissions started at 0347 ship-time on the forty-third day of approach, when they were three weeks from orbital insertion and close enough for two-way communication with a light-delay of twelve minutes one-way.

The first transmission was not directed at them. It was a community broadcast — a local audio signal at medium power, probably covering a radius of a few hundred kilometers, containing what sounded like a weather report, a community schedule, and a brief official announcement about a water distribution schedule. It was in English, with an accent that had evolved away from anything Colman recognized — the specific acoustic product of eleven years of isolation, where the population had developed its own sound without external influence.

They were on the day shift when it came in. Colman was in the signal analysis room, as he had been on most days for the last three months. Linh was at the adjacent station. The third presence in the room was Alex, who had been there since the beginning of shift with permission and who had not moved in five hours.

When the first signal resolved through the antenna array, all three of them were looking at the same screen.

Colman watched Alex's face. He had prepared himself for this — for the moment when the abstraction of Earth became a voice — and he found that his preparation had been inadequate. The voice on the Southern Reach transmission was a woman's voice, warm and practical, describing the revised water distribution schedule for the Nelson district with the specific tone of someone for whom this information was profoundly important, which it was, and which was visible in every word.

“She's tired,” Alex said.

“How do you know?” Linh asked.

“The way she says the numbers. She's saying them from memory, and the memory is heavy.” He was still watching the screen as if the speaker were visible. “How many people live in Nelson?”

“Pre-war, approximately fifty thousand,” Linh said. “Current estimate—”

“I know the estimates,” Alex said. “I mean now. The woman making this broadcast. How many people is she responsible for?”

Colman looked at him. “She's doing a weather report.”

“No,” Alex said. “She's doing a resource allocation announcement with weather context. The weather matters because the water comes from the sky. She's responsible for the water.” He paused. “She's responsible for who gets it.”

The transmission continued. Weather (cool, dry, good for the northern crops). Community schedule (council meeting on Thursday, children's school session moved to morning). Water distribution (Nelson district, revised to twice per week, allocation

unchanged at twelve liters per person). And then, in the announcer's voice, a slight change of register — not quite hesitation, but weight:

“We have received confirmation from the Northern Observatory that the approaching vessel remains on its current trajectory. The Council wishes to reassure community members that precautionary protocols remain in place and that the Council is monitoring the situation fully. A community briefing will be held Friday evening.”

Colman looked at Linh. Linh looked at Colman.

“They know,” Linh said.

“They’ve known for three years,” Colman said. “The Observatory probably picked us up about the same time we found the satellite.”

“The satellite wasn’t ours,” Alex said. He had been following both conversations simultaneously. “The mountain people’s satellite. Did they tell the Southern Reach?”

“We don’t know,” Linh said.

“Or the Southern Reach found us on their own.” Alex was quiet for a moment. “She said precautionary protocols. What does that mean for them?”

“It means they’ve thought about what to do if we’re hostile,” Colman said.

“And if we’re not hostile?”

“They’re probably still thinking about that,” he said.

Alex listened to the rest of the broadcast in complete silence. The woman’s voice moved through the community schedule with its specific practiced ease — the ease of someone who had done this particular task for years, who had made it part of herself, who was

part of the routine that kept a community organized and therefore alive. When the broadcast ended, he stayed with the silence for a moment.

Then: “Can you find the recording from four years ago? The one with Dr. Petrov?”

“It’s in the archive,” Linh said.

“I want to see if the woman doing the water broadcast is the same voice.”

A pause while Linh pulled the archive recording. She played the first fifteen seconds.

It was not the same voice.

Alex listened anyway. The woman being interviewed — Dr. Petrov, medical officer for the Southern Reach community health authority — was a different register, more formal, speaking about inventory projections with the precision of someone who had been trained to speak precisely about things that mattered. And visible in the frame, to her left, was a girl.

Seven years old in this recording. Now eleven. Dark hair, dark eyes, a stillness that was not shyness but the opposite — watchfulness, the quality of a child who had learned that watching was more useful than speaking. Calculating. Alex had been right about that.

“Her name is Mara,” Alex said. “In the credits.”

Linh looked at the archive listing. “*Mara Petrov, age 7.*” She looked at Alex.

“I want to talk to her,” Alex said.

Colman said: “She’s eleven.”

“I know.”

“We’re three weeks from orbit. We’re not going to be chatting with individual children before we establish communications at the governmental level.”

“I know that too,” Alex said, with a patience that was more than acceptance — it was the patience of someone who has identified an objective and is waiting for the right approach. “I just wanted to say it.” He paused. “She’s the person I want to understand.”

The first formal contact with the Southern Reach was made thirty-one days after orbital insertion.

Orbital insertion itself was unremarkable in the engineering sense — they followed the planned trajectory, reduced velocity on schedule, achieved the target orbit at 621 kilometers altitude above the mean surface — but the approach had involved passing close enough to the planet to see it with the naked eye, and that had not been unremarkable at all.

Colman watched Earth approach from the forward observation bay.

He had known what to expect. He had spent eleven years on Chiron’s surface and eleven years knowing that Earth still existed somewhere in the star field, altered but present. He had processed the photographs from the last functioning orbital observatories. He had studied the surface mapping that the Congreve’s own instruments had been producing for the last four months.

He had thought he was prepared.

The cloud cover was different. This was the first thing he noticed — not less cloud, but differently distributed, the atmospheric circulation patterns shifted in ways that were consistent with large-scale changes in land surface albedo. There was less reflected light

from the northern hemisphere's land masses than the pre-war models predicted, which could mean reduced vegetation cover, which was expected. The oceans looked right. That was a thing, somehow. The oceans looked exactly as he remembered them.

His mother had shown him a photograph of the Pacific taken from orbit when he was six years old. He had not thought about that photograph in a decade. Looking at the ocean from orbit now, he thought about it precisely and completely.

“You okay?” Bernard said, from beside him.

“Yes,” Colman said. “You?”

“I keep looking at it and revising down and then revising back up,” Bernard said. “It's not as dead as I thought it might be. Some of the southern land masses have significant vegetation. New Zealand looks —” He paused. “It looks inhabited. The right color, the right smoke signatures from the settlements.”

“It's inhabited,” Colman said. “We know it's inhabited.”

“Yes, but knowing and seeing—” Bernard shook his head slightly. “It's the first time I've seen it since we left. And it looks like—” He stopped again. “It looks like it's trying.”

Chapter 12: Mapping

The first month of orbit was not passive. The Congreve's instruments produced a systematic survey of Earth's surface — radiation signatures, thermal signatures, electromagnetic emissions, atmospheric chemistry — that built a picture with a precision that no surface-based instrument array could have matched.

The picture was not encouraging in its overall profile, but it contained pockets that were.

The Congreve's analysis team — Linh leading, with four Chironian scientists and two former Terrans who had expertise in planetary ecology — worked through the data over three weeks and produced a survey that Lechat presented to the full ship's company in an extended session on Level Two.

“Three major organized communities,” he said. “Multiple smaller ones distributed globally. The major three are what we're going to focus on.”

The Southern Reach.

New Zealand, southern Australia, and the southern tip of South America, connected by a loose confederation that had formed in the second year after the exchange — when the radiation fallout from the northern hemisphere had been mapped well enough to determine that the southern hemisphere was viable. Approximately four million people. Democratic in structure, with regional councils feeding into a central coordinating authority. Functional agriculture, basic industry, maintained communications infrastructure. Critically short of advanced medical supplies, pharmaceutical precursors, precision manufacturing capability.

“What does critically short mean in practical terms?” Lechat asked during the presentation.

“Treatable conditions going untreated,” Yuen said. She had been part of the analysis team. “Pre-war, the Southern Reach population had access to standard pharmaceutical production. The production facilities are gone — the supply chains that fed them are gone. They're operating on pre-war stockpiles plus locally synthesized basic compounds. The stockpiles are exhausted. The local synthesis covers about sixty percent of the essential drug list. The other forty percent—” She paused. “People are dying of things that don't kill people in a functional civilization.”

A silence.

“Next,” Lechat said.

The Mountain State.

Controlled by Chen Yi-jun, formerly General commanding the EAF’s North American Mountain Command. The US mountain west — Colorado, Montana, Wyoming, Utah, parts of Nevada and Idaho. Approximately six hundred thousand people. A command economy of unusual efficiency: organized rationing, maintained infrastructure, working manufacturing base using pre-war industrial equipment, the highest per-capita survival rate of any major organized community on Earth.

“How has he kept six hundred thousand people alive in the mountain west for eleven years?” Colman asked.

“Decision-making,” Yuen said. “The signal analysis suggests a central authority that made very fast decisions in the first year and executed them with minimal deviation. Infrastructure triage — some communities were prioritized, others were not. Medical priority was assigned by role: people with technical skills that the community needed were given priority access to scarce medical resources over those without.”

“Triage,” Bernard said.

“Yes. Formal triage, applied at population scale.”

The room was quiet.

“And the people who didn’t meet the priority criteria?” Lechat asked.

“Got what was available,” Yuen said. “Which was less. Chen’s record is not without cost.” A pause. “But six hundred thousand people alive. That’s not a small number, considering what happened.”

“And the Vale Federation?” Lechat prompted.

The Alps and northern Italy, extending into southern France and northern Spain. Approximately one and a half million people in a semi-feudal arrangement that had evolved from the geography — mountain communities, naturally isolated, naturally cooperative within their isolation, with the specific cultural inheritance of a part of Europe that had been organized around community resilience for centuries. Two universities still operating — not as pre-war institutions, but as genuine centers of learning, running on reduced resources with faculty who had stayed because there was nowhere else to go and students who had come because knowledge was being preserved there and they wanted to be where knowledge lived.

“A working knowledge tradition,” Linh said. “They have something neither of the other major communities have. Institutional continuity. People who know how to transmit complex technical knowledge across generations.”

“And what do they need?” Colman asked.

“Time,” Linh said. “They’re sustainable at their current level. They’re not going to collapse. But they’re also not going to develop. They need connections — to the Southern Reach’s agricultural capacity, to the Mountain State’s industrial base, to each other. They’re isolated by geography in ways that limit exchange.”

“And then there are the scattered communities,” Yuen said. She brought up a global map on the main display. Points of light scattered across every continent, varying in brightness based on estimated population and organizational level. Many points. Most of them small. Some of them connected to the major communities, most of them not. “These represent the majority of Earth’s surviving population, in absolute terms. Probably eight to twelve million people total, in groups ranging from a few dozen to a few tens of thousands. Some functional, some desperate.” A pause. “Some very desperate.”

The map hung in the display. Alex, sitting in the middle of the audience, was looking at the scattered points with the concentrated attention he gave to systems that had interesting properties. He was looking at the small ones — the faint points, the barely-there lights at the edge of the map.

“The people in the faint ones,” he said, audibly.

Yuen looked at him. “Yes?”

“Do they know we’re here?”

“Some of them. The ones with radio capability. Others—”

“Will they be able to access what we bring?”

“That depends on what we bring and how we bring it.”

Alex nodded slowly. “Okay,” he said, and went back to looking at the map. But his attention had shifted. He was looking at the faint points with a quality that was specific and slightly difficult to name. The way you look at something you’ve decided you’re responsible for without having been asked.

Chapter 13: The Decision

The debate about first-contact sequencing occupied four full sessions over eight days. This was faster than most debates of comparable consequence, which Colman attributed to the fact that everyone on the ship had been thinking about it for two and a half years and was now in possession of enough specific information to make the thinking productive.

The question was simple: which community did they approach first?

The answers were complex.

The case for the Mountain State was strategic: Chen Yi-jun was the actor who had been tracking them longest, had the most intelligence about them, and was the most capable of organized response — positive or negative. Engaging him first acknowledged his capability and set a precedent of dealing with him as a peer.

“That’s exactly the wrong first message,” Rashida said. “The Mountain State is a command economy under a single decision-maker. Treating it as the primary actor in Earth’s recovery implicitly endorses its organizational model.”

“We’re not endorsing it by talking to it,” Colman said.

“We’re endorsing it by talking to it first.”

“We’re not going to avoid talking to it. We’re talking to all of them.”

“Sequence matters,” Rashida said. “The first contact establishes the frame. If we go to Chen first, everyone else on Earth sees us as his guests. His partners. That makes the equal distribution principle essentially fictional — everyone knows who the real relationship is with.”

“The Southern Reach,” Kath said, “is the largest democratic community on Earth. It has four million people who are governing themselves by consent, who have maintained a degree of openness that is recognizable to us, and who are critically short of things we can provide. Approaching them first is not just strategically cleaner — it’s the right thing to do on its own terms.”

“It’s also safer,” Colman said. “Chen’s been tracking us for three years. He’s had time to form an opinion of us and make plans based on that opinion. The Southern Reach has been monitoring our approach but their planning is open — it’s in their community broadcasts. They’re going to be surprised and hopeful and desperate, in roughly that order, and that’s manageable.”

“Chen won’t be surprised,” Bernard said.

“No. And that’s the other reason to go to the Southern Reach first. We need to establish who we are and what we do before we talk to someone who’s been modeling us for three years.”

The logic of this prevailed, not because it was perfect but because it was the best available answer to the question everyone had been sitting with for eight days. They would approach the Southern Reach first. They would establish contact, demonstrate their capabilities, begin the distribution of material assistance. And at some point in that process — when they had a baseline established and a track record visible to all parties — they would make contact with Chen.

“He’ll reach out before then,” Lechat said.

“Almost certainly,” Kath said.

“And when he does?”

“We’ll respond honestly.” She paused. “We always do.”

Chapter 14: First Contact

The first formal contact with the Southern Reach happened on a Wednesday, which was relevant only in the sense that the Southern Reach’s council met on Wednesdays and the comms officer who picked up their frequency at 0900 ship-time had been on duty since 0600 and had the particular alertness of someone who has been waiting for something specific.

She said: “This is Southern Reach Communications Center, Nelson facility. We have you on an open frequency. Please identify yourself.”

Twenty-four-minute round trip. They sent their first signal and waited.

Lechat had prepared the response with the care he gave to communications that would have permanent historical significance. Not in the grandiose sense — nothing in the text of it was grandiose — but in the sense of being precise and complete and honest, which was the standard he applied to everything.

This is the Henry B. Congreve, departing Alpha Centauri IV on a mission of contact and assistance. We carry three hundred and fifty-one people — Chironian-born and descendants of the Mayflower II's passenger and crew complement. We are in stable orbit at six hundred kilometers. We do not represent any Earth nation or authority. We come of our own initiative. We understand you have been monitoring our approach and would like to establish communication at your convenience. We have no requirements or demands. We have significant material and technical resources we are prepared to share. Please advise how you would like to proceed.

They waited twelve minutes. Then another twelve. The signal took twelve minutes to reach Nelson and twelve minutes to return. A twenty-four-minute window of silence. Colman spent it in the communications room, standing rather than sitting, which was his default posture when he was waiting for something that mattered.

The response, when it came, was in the voice of a woman who was not the comms officer. An older voice, with the specific cadence of someone who speaks to groups regularly and has learned to put weight in the right places.

This is Councillor Elena Vasquez, Communications and External Affairs, Southern Reach Central Council. I am speaking on behalf of the Council as a whole. We have received your message and are verifying its content against the observations we have maintained of your approach. We acknowledge your identification and the extraordinary nature of this contact.

A pause.

I am going to be honest with you, because I assume you can tell the difference. We have debated for three years about what your arrival means. We have not resolved that debate. What I can tell you is that four million people are counting on this conversation to go well, and I believe yours do too, so let's try to be useful to each other.

We have some questions. I expect you do too.

We'd like to begin with the medical situation. We have a significant deficit in pharmaceutical supplies. Can you help with that, and if so, what do you need from us in return?

The communications room was very quiet when the message finished playing.

“She went straight to it,” Bernard said.

“She’s been waiting three years to ask,” Colman said.

“She also asked what we need in return,” Kath said. “Notice that.”

“She expects trade,” Linh said.

“She’s pre-empting the dependency,” Kath said. “She wants to offer something before we offer something, so the relationship doesn’t start with them in debt.” A pause. “That’s very good, actually. Better than I expected from someone who’s been running a crisis government for eleven years.”

Lechat was drafting the response. He read it aloud before sending:

Councillor Vasquez. Thank you for your directness. We'll match it.

On the medical question: yes. Our fabrication systems can produce pharmaceutical compounds to hospital-grade standards. We have the specifications for everything on the WHO essential medicines

list and several hundred additional compounds. We can begin production immediately and can deliver to your surface facilities at locations you specify. We ask nothing in return — not as a strategic position, but as a statement of principle. Scarcity is not something we experience and we do not believe it serves anyone to act as if we did.

What we do ask is your honesty about what you need and where you need it, so we can apply our resources where they're most useful.

We also want to make clear: we are making contact with all surviving communities simultaneously. The assistance we provide to you will be provided equally to others. This is not negotiable. If that causes difficulty, we would like to know about it early.

We look forward to your response.

“Scarcity is not something we experience,” Bernard repeated. “We do not believe it serves anyone to act as if we did.’ Is that going to land well?”

“It’s going to be the most startling sentence she’s ever read,” Lechat said. “But it’s the most important one in the message.” He sent it. “She asked for honesty. We gave it.”

They waited twenty-four minutes.

The response, when it came, was longer. Vasquez had clearly taken the full transit time to draft it rather than respond immediately. It was precise, organized, and near the end, it had a sentence that Colman read three times:

Your statement that you make no demands and will share with all communities is noted. I will be candid: it is difficult to believe. Not because I doubt your intentions, but because I doubt you understand what you’re proposing. Equal distribution to all

communities on this planet includes communities that are not democratic, not transparent, and not accountable to anyone. If you give equal assistance to the Mountain State, you are strengthening the hand of an authority that has operated without consent or accountability for eleven years.

We are not asking you to make a political judgment about Chen Yi-jun. We are noting that “equal distribution” is not a neutral position.

We are prepared to receive your first medical delivery at the coordinates attached. We request a video communication at the earliest opportunity.

Lechat read it twice. “She’s right,” he said. “It’s not a neutral position.”

“Nothing is,” Kath said.

“What do we say?”

“The truth,” Kath said. “We tell her the truth about why equal distribution is the only principle we can operate on. We don’t hide that it’s principled. We don’t pretend it’s neutral. We acknowledge the costs and explain why we accept them.”

“And if she still doesn’t accept it?”

“She will eventually,” Kath said. “She’s a smart person in a hard situation who has been making reasonable choices with limited information. When she gets more information, she’ll make better choices.”

“How certain are you of that?” Colman asked.

Kath looked at him. “I’m certain that if she doesn’t, the principle is still worth maintaining.” A pause. “I’m also fairly certain she will.”

The video communication was established four hours later. It was the first time any of the Congreve's passengers had seen an Earth survivor face-to-face, through a screen, in real time with the unavoidable twenty-four-second delay. Vasquez was sixty-three, with gray hair cut short and the particular quality of someone who has not slept fully in eleven years and has made a kind of peace with this. She had a precise face and eyes that moved quickly and a way of holding herself that Colman recognized: the posture of someone who carries the weight of other people's survival and has learned to carry it without letting it show.

She saw them on her screen — Lechat, Colman, Kath, Linh — and she was quiet for a moment.

Then: "You look well-fed."

"We are," Lechat said.

"Good. I'm glad someone is." A pause that was slightly longer than the signal delay. "I've been briefed on the Chironian social model. Are you all—"

"Mixed," Colman said. "I came from Earth. Lechat did. About a third of the ship came from Earth originally. The rest are Chironian-born."

Vasquez looked at him. "You were on the Mayflower II?"

"Yes."

"Where from?"

"New Mexico. Originally."

She nodded slowly. "There's not much left of New Mexico."

"I know."

"Are you going to be the one who handles the medical supplies?"

“We’re organizing it now. We’ll have a first delivery manifest ready within—”

“How soon can you have the first shipment down?” Vasquez said. Her directness had a specific quality — not impatience, but the efficiency of someone who has learned that getting to the point saves lives.

“Forty-eight hours for the first batch,” Bernard said, from off-screen. “We need to calibrate the fabricators to your specifications and run a quality verification pass.”

“Forty-eight hours,” Vasquez repeated. “We have seventeen people in critical condition in Nelson alone who are going to die within a week if we don’t get antibiotics we can’t produce.” A pause. “I am not telling you this to manipulate you. I’m telling you so you understand the real timeline.”

“I understand,” Lechat said. “We’ll prioritize.”

“Thank you.” She was quiet for a moment, looking at them through the screen with the specific quality of someone reassembling their assumptions about the world. “I want to say something. I’ve been doing this work — keeping people alive, managing the politics of survival, running the communications with other communities — for eleven years. And in eleven years I have not once been offered something without being told the price first.”

“There’s no price,” Lechat said.

“I understand that you believe that,” Vasquez said. “I believe that you believe it. I’m going to hold onto the part of me that doesn’t yet, because that part has kept me and four million other people alive.” She looked directly into the camera. “But I’m listening.”

PART FOUR: EARTH

Chapter 15: Landing

The shuttle from the Congreve descended through cloud in the late afternoon, with the light going orange ahead of them and the coast of the South Island visible below — green and brown, with the blue of water on both sides narrowing the island to something that looked, at altitude, fragile. Which it was, in the way that all things that survived catastrophe are fragile: not broken, but permanently aware of how easily things break.

Colman was in the co-pilot seat. The pilot was a Chironian woman named Ora who had been flying shuttles for fifteen years and found them interesting rather than consequential, which was the Chironian way — if a thing was worth doing, you did it well and without unnecessary drama.

He watched the ground come up.

The first thing that was wrong was the color of the sky on the horizon. Not wrong exactly — there was nothing technically incorrect about the pinkish haze in the north that indicated the atmospheric aftermath of seven-year-old burning. But it was wrong in the sense of being new, a color that had not been in Earth's sky in any photograph from his memory.

The second thing was the absence of lights. Pre-war New Zealand had lit itself generously at night — the kind of light pollution that made stars hard to see from the surface. The settlements visible as the shuttle descended were specific and contained, islands of warm light in the dark rather than the blurred glow of a civilization that wasn't paying attention to where it put its energy.

“Nelson below,” Ora said. She didn’t say it as drama. She said it as navigation.

The settlement was visible now in the early dark: larger than a village, smaller than a pre-war city, with the specific geometry of a community that had built itself around available materials rather than pre-existing infrastructure. The older buildings at the center were pre-war — stone and concrete, built to last, now serving functions different from their original ones. The newer construction at the edges was adaptive — local materials, practical designs, the kind of building that happens when people are working out how to live rather than how to impress each other.

A landing area had been cleared at the edge of the settlement, marked with lights — actual lights, electric, which meant there was functioning power infrastructure and someone had decided this landing merited the expenditure.

Colman felt the shuttle set down. The ground met it.

He sat for a moment after landing without moving.

Kath, in the seat behind him, put a hand on his shoulder. Not heavily — just contact. Confirming he was there.

He opened the hatch.

The air came in.

It was cold — southern hemisphere late autumn, the air off the mountains — and it smelled of the ocean and of wood smoke and of something green and alive and specific that he could not name but that his body recognized before his mind got to it. He had grown up in New Mexico and not in New Zealand, but the Earth smell was Earth regardless of latitude. It got to somewhere under the trained responses.

He stood in the hatchway for a moment.

Then he walked down the landing ramp and put his feet on the ground.

The ground was slightly soft, which he hadn't expected — the grass at the edge of the landing area had been compressed by years of foot traffic but was still alive. He could feel the micro-resistance of it through his boots, the specific texture of organic matter under load.

Vasquez was there. She was shorter than she had appeared on screen, with two people flanking her who had the economical bearing of people who had spent years being useful in difficult situations. She looked at him and did not offer her hand immediately, which was not rudeness — it was the assessment of someone who has learned to read new arrivals before committing to a posture.

“Colman,” she said.

“Vasquez,” he said.

She looked at him for a moment. “You're the one who came from Earth.”

“A long time ago.”

“Not so long,” she said. “Twenty years, maybe? You look—” She paused. “You look well. Which is what you said you were, and which is strange to see in person.”

“I know,” he said.

“It's going to be hard for some people,” she said. “The well-fed visitors. We're not going to have a wide public welcome. Not at first.”

“We weren't expecting one.”

“Good.” She looked at the shuttle. “Is the medical load in there?”

“First shipment. Antibiotics, antifungals, antivirals, two oncology compound sets, pediatric formulations. Bernard ran two verification cycles.”

“Who’s Bernard?”

“Chief of Engineering. He takes quality assurance personally.”

She looked at him again. “All right,” she said. “Let’s get started.”

The night in Nelson was spent in one of the community buildings — a former school gymnasium that had been converted into accommodation for guests and travelers, with cots and blankets and a woodstove that kept the space warm with the specific focused efficiency of a technology that humans had been perfecting for thousands of years. The medical team from the Congreve — two Chironian physicians and a pharmaceutical technician — went immediately to the clinic and didn’t come back until the following afternoon.

Colman lay on his cot in the dark and listened to Earth.

It was noisy in the specific way of a place that didn’t curate its sounds. The wind was audible — actual wind, with the irregular gusting of weather systems that had their own agenda. Birds. Something large moving at the edge of the settlement, probably an animal of some kind — the ecosystem had been recovering for eleven years and the large animals were back in force in the areas that humans weren’t using. Rain, eventually, starting as drops on the roof and building to a steady percussion.

He thought about the medical team at the clinic. Seventeen critical patients in Nelson alone. How many across four million people?

He thought about Bernard’s portable fabricators. About the twelve compact units in the shuttle’s cargo hold, each one capable of

producing any compound in the essential medicines database from locally available feedstock. About the fact that they had, currently in orbit, enough manufacturing capacity to address the entire pharmaceutical deficit of the Southern Reach in approximately three months of steady operation.

He thought about Vasquez's sentence: *"I have not once been offered something without being told the price first."*

He thought about Alex, who was on the ship with Kath — they had agreed that the first landing was a reconnaissance, not a family trip, and Alex had accepted this with the same patient strategic thinking he applied to everything, though Colman had seen him standing at the observation bay as the shuttle departed, watching.

The rain intensified. The woodstove ticked. He slept.

In the morning, the weight hit him.

He had forgotten about Earth gravity. Chiron was slightly lighter — 0.94 of Earth standard — and in eleven years his body had recalibrated to the point where Earth's gravity, a matter of a few percent difference, felt like someone had added mass to him overnight. Not debilitating. Not even uncomfortable, exactly. Just heavier. The specific heaviness of belonging to a planet.

He ate breakfast with Vasquez and two of the council members — a man named Torres who managed agricultural coordination and a woman named Park who ran the communications network. They had the practiced efficiency of people who use mealtimes functionally, and the specific quality of people who had been hoping for this conversation for years and were now managing the reality of it being more complicated than the hope.

"The equal distribution policy," Torres said, directly enough that Colman respected it. "You're going to provide the same assistance to

the Mountain State that you're providing to us."

"Yes," Colman said.

"Chen Yi-jun's community has maintained survival by rationing. If you eliminate the scarcity constraint, his rationing system loses its justification."

"Probably," Colman said.

"Which means his authority loses its justification."

"Possibly."

"That's going to be destabilizing."

"For Chen's authority, yes," Colman said. "Whether that's destabilizing for the six hundred thousand people in the Mountain State depends on what they do with the change." He drank his coffee. Earth coffee — actual coffee from a community that had apparently maintained a small growing operation in a greenhouse. It was better than he had any right to expect and he was deeply grateful for it. "I want to be clear about something. We're not trying to destabilize Chen Yi-jun. We're not trying to undermine his authority. We are providing the same assistance to everyone because providing less to some creates a hierarchy we don't want to create."

"You're going to create one anyway," Torres said. "Whoever gets the fabricators first—"

"We're not giving the fabricators to anyone first. We're making them available simultaneously to all major communities. The logistics of that are complex but it's not impossible."

Park had been listening. She had a more contained quality than Torres — the specific attentiveness of someone who manages a

communications network and has learned to listen for what people aren't saying. "You can manage the logistics from orbit," she said.

"Yes."

"And the Chironians who stay behind — you said some would stay?"

"Six people have volunteered to remain for an initial period of two years. They'll be distributed across the communities at locations where they can be most useful."

"Useful how?"

"Teaching," Kath said. She had come in quietly and taken the empty seat at the table. She had the specific Chironian quality of entering a room without making it a transition. "Showing people how to use the fabricators. Troubleshooting the systems. Being available." She paused. "Not managing. Not deciding. Just being there."

Park looked at Kath with a directness that had something evaluating in it — not hostile, but precise. "You're one of the Chironian-born ones."

"Yes."

"What's it like? Where you come from?"

Kath considered. "Clean," she said. "Which is not to say perfect. We have problems. But our problems are not resource problems. We have enough of everything. Our problems are the ones that remain when you've solved the material ones — questions of meaning, of purpose, of what to do with freedom when you have it entirely."

"Those sound like nice problems," Torres said.

"They are," Kath said. "I don't say that to taunt you. I say it because they're the problems we want to help you have."

There was a silence. Torres looked at his breakfast. Park looked at Kath.

“That’s either the most generous thing anyone has ever said to us,” Park said, “or the most patronizing.”

“I understand why it sounds both,” Kath said.

Chapter 16: What Survived

The first full week on Earth was structured around the medical emergency, which had a way of focusing priorities that the philosophical debates did not. Three of the seventeen critical patients in Nelson survived entirely because of the compounds that arrived in the first delivery. Two more survived because the secondary delivery, arriving thirty-six hours after the first, included the specific oncology compound that their condition required. The others — twelve of the seventeen — were already past the point where pharmacology could help, and they died, and the medical team from the Congreve was present for the deaths in the specific way of people who understood exactly what was happening and had no way to change it.

The Chironian physicians on the team were named Tara and Vorst. They were both in their thirties, and they had studied medicine on Chiron with access to the full literature and the full manufacturing capacity of a post-scarcity civilization. They had never treated a patient without the compound they needed. They had never watched someone die of a condition that was treatable.

Colman found Tara at the edge of the settlement on the second evening, looking at the mountains to the west with an expression that was not the Chironian calm he was used to seeing.

“First time?” he asked.

“We had cases on Chiron,” Tara said. “People who were too far along before diagnosis. Accidents.” She paused. “It’s different when it’s a shortage. When you know the compound exists. When you know it’s in the fabricator on the ship and it’s an hour away by shuttle and the person still—” She stopped. “We should have gotten here sooner.”

“We got here as fast as we could,” Colman said.

“I know. It’s not a logical response.” She looked at the mountains. “It’s a Terran response.”

He looked at her. “Yes,” he said. “Welcome.”

She made a sound that was almost a laugh. “How long before it becomes normal?”

“It doesn’t become normal,” Colman said. “You just learn to keep working.”

She nodded. She was looking at the mountains with the focused attention of someone establishing a reference point. “The mountains are beautiful,” she said.

“Yes.”

“On Chiron, nothing looks like this. The geology is different. The vegetation.” She paused. “Everything here is millions of years old. The stones are millions of years old. We built Chiron from scratch, in living memory.” She was quiet for a moment. “Earth has weight.”

“It does,” Colman said. “You feel it in more ways than one.”

The Southern Reach’s government was democratic in the practical sense — decisions were made by councils, councils were constituted by representatives chosen from communities, communities chose their representatives in ways that varied by location but always

involved some form of consent. It was not elegant and it was frequently slow and it had the specific organizational texture of a system that had evolved under pressure rather than being designed: the seams showed, the workarounds were visible, the patches on the patches were multiple layers deep.

It was also genuinely functional, which was not a given. Eleven years of crisis government had a way of producing either better or worse systems, depending on whether the crisis produced leaders who understood that their authority was contingent or leaders who had decided the crisis justified making it permanent. The Southern Reach had been lucky in the first year — its initial leadership had been technically competent and procedurally honest, and it had established the habits that subsequent leadership had found easier to follow than to overturn.

Vasquez was the current chair of the Central Council. She had come to the role in year four and had held it for seven years, which was longer than the pre-war norm for democratic tenures and which she had addressed by proposing a formal term limit that the Council had voted through with some relief. She was in her second and constitutionally final term and had the specific freedom of someone who had stopped worrying about re-election.

“What I need you to understand about our situation,” she told Colman on the third day, “is that we are not doing well and we are doing remarkably. Both are true simultaneously.”

“I believe it,” Colman said.

“The population is stable. The agricultural base is sustaining. The industrial capacity is — diminished but functional. We can make things. We can repair things. We can maintain things if we don’t lose too many more engineers to the gap.” She paused. “The gap is the problem that we don’t talk about publicly.”

“What gap?”

“The knowledge gap. The people who knew how to do the technical things that kept the pre-war infrastructure running were older. They’re dying of age, of illness, of accident. The generation that should have been trained behind them grew up in the crisis, when there wasn’t time or resource for formal technical education. We have twenty-year-olds who are brilliant and willing who don’t know enough to maintain the systems they depend on.”

Colman thought about the Vale Federation. “The universities in the Alps,” he said.

Vasquez looked at him. “You know about them?”

“We’ve mapped the major communities. The Vale Federation has two functioning universities.”

“We know. We’ve been trying to establish a reliable contact for three years. The geography and the distance—” She shook her head. “We can communicate. We can’t exchange people or materials at any useful rate.”

“We can,” Colman said.

She was quiet for a moment. “You’re going to move people between communities.”

“If people want to move. If communities want to receive them.” He paused. “We can connect the Southern Reach to the Vale Federation. We can get your young engineers into their universities. We can bring their faculty here for extended visits.”

“What do you want for that?”

“Nothing,” Colman said.

She looked at him for a long moment. “I keep waiting for the catch,” she said.

“There isn’t one. This is what we do.”

“Why?”

It was not a rhetorical question. She genuinely wanted to know. He thought about how to answer it — not the philosophical answer, which was complete and correct but which would land, here, now, in this woman who had been running a survival government for eleven years, as an abstraction — but the simpler, truer version.

“Because we can,” he said. “And because we can, not doing it would be a choice. And we don’t want to make that choice.”

She looked at him for a long moment. “All right,” she said, finally. “Let’s get to work.”

Chapter 17: The Principle in Practice

The first fabrication unit went operational on the surface of New Zealand on day eleven of the landing phase, in a facility in Nelson that had previously been a high school chemistry lab. The setup took four hours — the unit itself was compact, about the size of a large wardrobe — and the calibration and feedstock loading took another two. The first thing it produced, at Tara’s request, was a full batch of pediatric amoxicillin.

The second thing it produced was an argument.

The argument had been building since the first day and had finally crystallized around the question of access. The fabricator was in the Nelson facility. Nelson had a population of about forty thousand. The Southern Reach had four million people spread across New Zealand, southern Australia, and southern South America. The Nelson council members were already discussing how to allocate the fabricator’s output.

“We’re going to set up eleven more units,” Colman told Vasquez when she brought him the first draft of the allocation plan.

“I know. But in the interim—”

“In the interim, the Nelson unit is for Nelson’s community needs. It’s not a distribution hub.” He looked at the plan. “The allocation logic here — priority by medical need, which is correct — but the priority criteria are going to create a waiting list. Who manages the waiting list?”

“The medical authority.”

“And the medical authority is—”

“The Southern Reach Central Health Board.”

“Which is appointed by the Central Council.”

“Yes.”

Colman looked at her. She saw where he was going. “It’s not corruption,” she said. “The health board is competent.”

“I don’t doubt it,” Colman said. “But the appearance of the fabricator being controlled by the central authority is going to be a political fact regardless of the health board’s competence. And in six months, if there are eleven fabricators, they’ll all be administered by central authorities, and the central authorities will be using access as a policy lever.” He paused. “Which is exactly what we’re trying not to create.”

“Then how do you want it managed?”

“Open access. The unit is in the facility. The facility is open. Anyone who comes in and puts in a request gets served, in the order they arrive.”

“That’s—” She stopped. “That’s not practical. We’d have a line around the building.”

“Yes,” Colman said. “Until people understand it’s not going away. Until the scarcity reflex stops. Right now, people see a resource and they move to secure it, because securing resources has been adaptive for eleven years. Once it becomes clear that the resource is reliably available — that there’s no benefit to being first because there’s enough for everyone — the rush stops.”

“How long does that take?”

“I don’t know,” Colman said honestly. “On Chiron it took a generation, but Chiron never had the scarcity to start with. Here it’s going to take longer because you have to unlearn something, not just learn something new.”

Vasquez was quiet for a moment. “You make it sound like patience.”

“It is patience,” Colman said. “And it’s hard, because in the meantime people are going to fight over the fabricators. And some of the fighting is going to be ugly.”

“And you’re prepared for that.”

“We’re prepared for it,” Colman said. “We’re not prepared to stop it. The stopping has to come from inside.”

The tension between the equal-distribution principle and the Southern Reach’s organizational interests crystallized most clearly in the third week, when Vasquez raised the question of the Mountain State in the most direct way she had managed yet.

They were in the council chamber — an actual chamber, with a long table and tall windows showing the mountain range. It had the specific gravity of a room where serious decisions had been made,

and the ceiling had the slightly stained quality of a room that had been used continuously for eleven years.

“I want to be direct,” Vasquez said, which in her case was a courtesy phrase, since she was always direct. “The assistance you’re providing us is going to change our situation significantly. Within three months, we’ll have the pharmaceutical deficit addressed. Within a year, if the fabrication units work as described, we’ll have manufacturing capacity we haven’t had since year two. That will change the balance of resources between the major communities.”

“Yes,” Colman said.

“If you provide the same capability to Chen Yi-jun, the Mountain State goes from being resource-constrained to being the single most powerful political entity in the northern hemisphere. They already have the most disciplined military structure. Add industrial capacity and full pharmaceutical sufficiency and you’ve created something that every other community on Earth is going to have to deal with.”

“We’ve thought about this,” Colman said.

“I know you’ve thought about it. I’m asking what you’ve decided.”

“We’ve decided that the equal distribution principle is more important than the political consequences of applying it,” Kath said. She had been sitting at the far end of the table, which was her default position — visible, present, but not at the center. “Not because we’re naive about the consequences. Because the alternative — deciding who gets what based on our assessment of their political value — requires us to become exactly the kind of actor we’re trying not to be.”

“A judge,” Vasquez said.

“A power,” Kath said. “With favorites. Which is what Earth’s system was before the war, and which is a large part of why the war

happened.”

Vasquez looked at her. There was something in the look that was not agreement but was the recognition of a well-constructed argument. “Then you’re betting that the equal distribution of capability leads to better outcomes than managed distribution.”

“We’re betting that giving everyone the same tools creates the conditions for the outcomes to be driven by the people themselves rather than by us,” Kath said. “Which is the only kind of outcome that lasts.”

“Chen’s system doesn’t operate that way,” Vasquez said.

“No. But the people in it do.”

The room was quiet.

“Meaning?” Torres said.

“Meaning that six hundred thousand people who have been living under a command structure for eleven years are still human beings who have preferences and values and who are capable of choosing differently if they’re given conditions that make different choices possible.” Kath looked at her hands. “Not all of them, not immediately. But enough, eventually.”

“The fabricators,” Park said. She had been quiet through most of the session. “If the fabricators go to the Mountain State with the same open-access model you’re implementing here—”

“Chen is going to manage that very carefully,” Colman said. “I don’t think he’ll restrict access. He’s too smart for that — restricting access when people can see you have something they can’t have is politically corrosive. But he’ll manage how people understand it. He’ll frame it.”

“Frame it how?”

“As a resource his leadership acquired for the community. Which is true, in a way. We’re giving it to him in the sense that it’s at his location. He’ll take credit for securing it.”

“And you’re comfortable with that?”

Colman thought about it. “I’m not comfortable with it. I think it’s a distortion. But I also think the fabricator keeps working regardless of the story told about it, and over time the story becomes less important than the fact.”

“Unless the story becomes self-reinforcing,” Torres said. “Unless ‘Chen secured us the fabricator’ becomes ‘Chen controls the fabricator’ becomes ‘Chen deserves to control everything he secured.’”

“That’s the risk,” Colman said. “Yes.”

“And you’re accepting the risk.”

“We’re accepting the risk,” Colman said.

Chapter 18: Chen

The first transmission from the Mountain State arrived on day twenty-two of the landing phase.

They were in the Congreve’s communications room — Colman and Lechat and Linh, the three of them on the 0600 shift. Linh had been monitoring the Mountain State frequencies since they’d entered orbit, noting the patterns and timing of the encrypted traffic, and had told Colman two days earlier that the patterns were changing: the intervals were getting longer, the signal slightly stronger. Someone was warming up a longer-range transmitter.

When the signal came in, it was on the open frequency they had announced as their public contact channel. Encrypted, but with a header that identified it as a Mountain State transmission and flagged it as intended for the Congreve.

“They want a reply on the same channel,” Linh said.

“Decrypted?” Lechat asked.

“No. They’ve sent the key.”

Lechat looked at Colman. “Interesting.”

“It says they want a conversation, not an exchange of documents,” Colman said. “The encryption is courtesy, not security. They know we could read the transmissions without it.”

They decrypted the message and it appeared on the main display.

To the Henry B. Congreve:

I am General Chen Yi-jun, commanding the Mountain State, which comprises the surviving organized population of the US Mountain West under my authority.

I have been following your approach for three years. I have reviewed your public transmissions during the current landing phase and your prior transmissions during approach, which your signal management was not designed to fully conceal. I am familiar with your capabilities, your social organization, and your operational principles.

I am not transmitting to ask for assistance. I am transmitting to offer it.

You will have observations of this region that I can clarify. You will have questions about what we have here that I can answer. You will

have plans for this planet that I can help with.

In return, I have a proposal for consideration.

*I suggest we communicate, beginning at your earliest convenience.
I am available continuously.*

General Chen Yi-jun

The room was very quiet after Lechat finished reading it aloud.

“Not a plea,” Bernard said. He had appeared in the doorway at some point, with coffee. “He said he predicted that.”

“He did,” Colman said.

“He’s offering to clarify our observations,” Linh said. “He means he knows what we’ve been looking at and knows we’ve been uncertain about some of it.”

“He’s been watching the same observations from a different angle,” Lechat said. “He has surface-level intelligence and we have orbital.” He set the message down. “He wants to compare notes.”

“He wants to know what we know,” Colman said. “And he wants to frame the exchange as mutual before we can frame it as us providing and him receiving.”

“All of that simultaneously,” Lechat said. “He writes like he thinks quickly.”

“He does everything quickly,” Linh said. “The Mountain State’s operational record suggests decision cycles on the order of hours for major resource allocation changes. That’s not a bureaucracy. That’s a single person with very good information processing.”

“And the proposal?” Lechat asked.

“We don’t know what it is yet,” Colman said.

“No.” Lechat looked at the message again. “I have a proposal for consideration.’ That sentence is the most important one in the message. Everything else is establishing that he’s capable and informed and not desperate. The proposal is the actual content.” He paused. “He’s not going to tell us what it is until he has our attention and has established that we take him seriously.”

“He has our attention,” Colman said.

“Then we should reply and tell him so.”

The reply was brief, precise, and in Lechat’s cleanest register:

General Chen. We’ve read your transmission with interest. We’d like to begin communications at your earliest convenience. We suggest a video call in two hours, if that works for your timing. We’re genuinely interested in what you’re seeing from the surface. We’ll reserve judgment on the proposal until we’ve had a conversation.

Commander Lechat, Henry B. Congreve.

The response came back in forty minutes — under the two-hour light delay, which meant it had been drafted and sent within minutes.

Two hours is acceptable. I’ll send the secure channel details.

“He’s been sitting at his console waiting for our answer,” Bernard said.

“He’s been sitting at his console waiting for three years,” Colman said. “Two hours is practically immediate.”

Chapter 19: Mara

The shuttle brought Alex down on day twenty-eight.

He came with Kath and with Tomas and with Saan — the children, in Lechat's phrase, having made a collective and apparently irresistible case for inclusion that Kath had endorsed and Colman had accepted with the specific calculation that a ten-year-old Chironian child's perspective on Earth was going to be one of the more useful things in his field kit.

Alex's reaction to the landing was characteristic. He did not perform wonder. He observed.

The landing area was the same one at the edge of Nelson that the first shuttle had used, and a small group was there to meet them — Vasquez, a council representative, and three community members who had come out of what seemed to be simple curiosity. There was also a girl.

She was standing slightly to the side of the official group, not quite part of it and not quite separate, with the specific positioning of someone who had found the most information-rich vantage point available. Eleven years old, dark hair, with her mother's precise face and eyes that moved quickly over everything — the shuttle, the Chironians, the Terrans, the children. She was calculating something. Colman had the impression she was always calculating something.

Alex saw her immediately. He had the peripheral vision of someone who looked for specific things rather than general things.

"Is that Mara?" he said quietly, to Colman.

"I don't know. Probably."

Alex walked over to her, directly, in the Chironian way — without preamble, without the social softening that Terran children were trained to use. “Are you Mara Petrov?”

She looked at him without flinching. “Are you the Chironian?”

“I’m Alex. Colman’s kid. From Alpha Centauri.”

She looked at him for a moment with the evaluating quality she had in common with Vasquez. “You’re not what I expected,” she said.

“What did you expect?”

“Something more—” She considered. “More impressive. Like an envoy or something.”

“I’m ten,” Alex said.

“I’m eleven,” she said. “Come on. My mother’s going to want to talk to the adults for hours. I’ll show you the settlement.”

Alex looked at Colman. Colman gave a minimal nod.

“Tomas, Saan,” Alex said, “come meet Mara.”

The settlement tour that Mara gave the three Chironian children was, Colman learned from Alex’s later account, one of the most informative briefings of the Earth visit.

She was, in Alex’s words, “very specific about numbers.” She knew the population of every district of Nelson to within a hundred. She knew the daily food production in calories per capita and the seasonal variation and the three crops that were performing below projection and why. She knew the medical situation — not from the official reports but from the wait times at the clinic and the conversations she’d overheard at the supply depot. She knew how

many people had died in the previous year and from what causes and whether those causes were preventable.

She moved through the settlement with the ease of someone who knows every corner of it, and she annotated the tour with data the way a trained guide annotates landmarks.

“The grey building on the left is the processing center for grain storage,” she told them. “They had a mold problem two seasons ago that destroyed about fifteen percent of the stored winter wheat. The council decided to keep it quiet because they didn’t want people to panic and start hoarding. But they cut the bread allocation in February by eight percent and everyone knew something was wrong.”

“Did they tell people eventually?” Saan asked.

“They told people in March, after they’d replaced the damaged stock with the summer harvest.” Mara looked at the building without particular expression. “Some people were angry about the secrecy. Most people understood why.”

“Why?” Tomas asked.

“Because panic-hoarding would have destroyed more than the mold did. If people thought the supply was threatened, they’d have taken more than their allocation to protect themselves, which would have actually created the shortage they were afraid of.” She paused. “A self-fulfilling prophecy. It’s a pattern we see a lot.”

Alex was looking at her with his most concentrated attention. “You know a lot,” he said.

“You have to,” she said simply. “If you don’t understand the supply situation, you don’t understand anything that matters.”

“Why does it matter to a kid?”

She gave him a look that was not unkind but was very precise. “On Chiron, does it matter?”

“Not the way it does here,” Alex said.

“That’s the answer,” Mara said. “Here it matters because here, what’s available changes what’s possible. You don’t know what kind of day you’re going to have until you know what’s available that day.”

Saan said: “That’s a very constrained way to live.”

“It’s the only way I know,” Mara said. There was no self-pity in this — it was information, stated clearly.

“How do you know so much about the supply numbers?” Tomas asked.

“My mother is on the Health Board. I listen to her work.” Mara paused. “And I’ve been making my own notes since I was seven. In a notebook.” She looked at them. “Do you know about notebooks? Paper?”

“We know about paper,” Alex said.

“I have three notebooks. Numbers for everything I can count. Because things that get written down don’t disappear.”

Alex was quiet for a moment. Then: “What’s the most important number right now?”

She didn’t hesitate. “Antibiotics in stock at the central clinic. Last week it was five days’ worth at current consumption. This week I don’t know yet.” She paused. “Your ship is changing that number. We just don’t know by how much.”

“By a lot,” Alex said. “The fabricators can produce as much as you need.”

“As much as you need,” Mara repeated. She said it with a quality that was not skepticism exactly but was the specific careful attention of someone hearing a phrase in a language they don’t fully trust. “What does that feel like? Where you’re from? When you know you can have as much as you need?”

Alex thought about it seriously. He looked at the processing center, the grey building with its mold history and its managed secrets. “I think—” He paused. “I think it feels like what it’s like for you, but without the counting.”

“Not measuring all the time.”

“Not needing to,” Alex said. “Not because there’s so much you couldn’t count it. But because it doesn’t feel like — it doesn’t feel like the supply is what you’re living inside.”

Mara looked at him. The look was very direct and very specific and had something in it that Colman, watching from a distance, recognized: the look of someone who has found a person worth listening to.

“What does it feel like like you’re living inside?” she asked.

“Questions,” Alex said. “Mostly.”

“Questions,” Mara repeated. She seemed to turn this over. Then: “All right. Come see the clinic.”

Dr. Adira Petrov was fifty-one, compact and precise in the way of someone who had spent decades managing large amounts of information in small spaces. She looked like Mara in the way that children look like the parent who gave them their essential character rather than their surface features — same quality of attention, same directness, same economy of expression.

She welcomed the visitors from the Congreve with a specific professional warmth that was clearly genuine and clearly also contained the undercurrent of a person who has been waiting for this for a very long time.

“The fabricators,” she said, setting down the supply manifest she’d been annotating. “How much can we ask of them?”

Tara, the Chironian physician who had been working in Nelson for three weeks, said: “The current specification supports approximately four hundred compound types. We can expand that. Anything in the medical literature with a known synthesis pathway—”

“Synthesis pathways for several of our critical drugs are—” Petrov stopped. “We lost the reference library in year two. Flood damage to the server facility. We had hard copies of some things, not others.”

“We have the complete WHO essential medicines synthesis library,” Tara said. “And several thousand additional compounds. We can transfer the full database to your local systems.”

Petrov looked at her. The look had in it something that was not exactly emotion — it was too contained for that — but was the very close edge of it. “We lost people because we lost those references,” she said.

“I know,” Tara said. “I’m sorry.”

“Don’t be sorry. Just give us the database.” She turned back to her manifest. “Mara.” She said it without looking up.

“Yes?” Mara said, from the doorway.

“You have school in an hour.”

“I know.”

“Go.”

“Yes.” Mara looked at Alex. “Tomorrow?” she said. It was not quite a question.

“Tomorrow,” Alex said.

She left. Petrov watched her go and then looked at the Chironian boy. “She talked to you,” she said. “She doesn’t usually talk to people she’s just met.”

“She has things to say,” Alex said.

“Yes,” Petrov said. “She does.” She went back to her manifest. “You said four hundred compounds. What about antipsychotics? We have three people in Nelson who were on maintenance medication before the war and who have been — managing, with what we can synthesize, but it’s not adequate.”

Tara sat down and opened her handscreen. “Show me what you have. We’ll work through it.”

Chapter 20: The Mountain State

The flight to Colorado took three hours by shuttle from Nelson, at the altitude and speed that kept them in the upper atmosphere — fast enough to be efficient, low enough for the instruments to get surface readings.

The transition was visible from the air.

The southern hemisphere’s landscape had the look of something that had been hurt and was recovering: the scars were visible in the form of changed vegetation patterns, the absence of certain types of infrastructure, the geometric remnants of things that had been there and were now not. But the recovery was also visible — the rivers were

running, the forests were filling back in at their edges, the settled areas had the specific look of human occupation that had been there long enough to become part of the landscape.

The northern hemisphere at this latitude told a different story. Less recovery. More silence.

The Mountain State's territory was visible from the air as a zone of managed clarity: the settlements were regular in their layout, the agricultural fields geometrically precise, the infrastructure connecting them visibly maintained. From altitude, it looked like a system. Because it was.

The landing area at Fort Collins — the Mountain State's administrative center, which had been a university city before the war and was now something more specific — was different from Nelson. There were people in organized positions at the perimeter. Not threatening — there was no visible weaponry — but organized. Positioned. The difference between a welcome reception and a security protocol was not large, visually, but Colman had spent enough time in both to know which one this was.

Chen Yi-jun was there.

He was sixty-three, which was close to the age Colman had estimated from the voice in the transmissions. He was shorter than Colman expected, which was a predictable bias — command voices fill spaces that bodies don't. He had the compact, economical build of someone who had been physically disciplined for fifty years and had not stopped being disciplined because the circumstances changed. He wore ordinary clothes — work pants, a grey shirt, a light jacket — in the way that people wear ordinary clothes when the idea of a uniform has become redundant.

He watched the shuttle set down with the attention of someone observing a system in operation, not a spectacle. When the ramp came down, he walked forward and stood at its base. He did not

extend his hand first. He waited for them to come to him, which was not arrogance — it was the natural behavior of someone who is on their ground.

“Commander Lechat,” he said, when Lechat reached him.

“General Chen,” Lechat said.

“You’re shorter in person,” Chen said. “Not an observation on your significance. A data point.”

Lechat absorbed this. “You’re shorter than I expected as well.”

“Good,” Chen said. “We’ve calibrated.” He looked at Colman. “Colman. Former Staff Sergeant. Current engineering officer. You were on the Mayflower II.”

“Yes.”

“And you’ve been on Chiron for eleven years.”

“Yes.”

“Then you’ve been living in a world where the resource constraint doesn’t exist,” Chen said, “for exactly as long as I’ve been living in a world where it does. We should have interesting perspectives on the same questions.”

This was, Colman reflected, the most compressed, precise, and accurate characterization of the relevant contrast that he had heard from anyone on this planet.

“I think you’re right,” he said.

Chen looked at Kath. He looked at her for a longer moment than he’d looked at the others, with the specific quality of someone who has encountered a new classification and is determining where it fits.

“Chironian-born,” he said.

“Yes,” Kath said.

“You’ve never experienced resource constraint.”

“Not as a survival condition.”

“And yet you came here.”

“Yes.”

“Why?”

Kath considered the question with her characteristic deliberate care.

“Because the questions you’re working with here are the questions we need to understand,” she said. “Chiron solved the material problem by not inheriting it. Earth solved it by surviving it. Those are different solutions and the difference is worth studying.”

“You came to study,” Chen said.

“Among other things.”

“What are the other things?”

“To help, where that’s useful,” Kath said. “To leave tools, where tools are wanted. To learn, as I said.” She paused. “And to be here. Which is its own thing, separate from purposes.”

Chen was quiet for a moment. He was looking at Kath with the specific expression of someone who has developed a model of the other person over three years of observation and is now revising that model based on direct contact. “You’re not what I expected,” he said.

“I’ve been hearing that on this visit,” Kath said.

“I meant it as a compliment,” Chen said. He looked at the group. “Come inside. I’ll show you what we’ve built, and then we’ll talk.”

What Chen had built was, as advertised in Yuen's orbital analysis, unusual.

The Fort Collins facility was housed in what had been the university's engineering complex — a cluster of buildings that had survived the war's aftermath in better condition than most of the northern hemisphere's institutional structures, a function of their distance from the primary exchange zones and their pre-war construction quality. Chen had added to them with a comprehensiveness that reflected either extraordinary planning or eleven years of systematic effort — probably both.

“Manufacturing, processing, and agricultural coordination center,” Chen said, walking them through. “We produce approximately seventy percent of the Mountain State's processed food here. The remaining thirty percent is distributed from regional centers.” He paused in a long corridor lined with storage bays. “You're welcome to ask anything.”

“What's the energy source?” Bernard asked. He had the engineer's habit of going to the foundational question first.

“Hydroelectric, primarily. We have three functioning generators on the Poudre River system. Solar supplementation on southern-facing installations. Wind turbines at altitude.” Chen looked at Bernard. “You're the engineering chief.”

“Chief Engineer. Bernard Fallows.”

“Your antimatter drive. The conversion from the Mayflower II configuration was completed when?”

“Year two of our renovation period,” Bernard said, slightly surprised. “How do you know the specifics?”

“The EAF monitored Chironian communications extensively before the war,” Chen said. “We have archives. Your ship's drive

specifications were in the technical intelligence files.” He paused. “I’m not sure what that information was intended to be used for, but it’s proved useful as a reference.”

Bernard made the sound he made when he encountered something technically interesting that was also slightly disturbing. “And the satellite,” he said.

“Observation Platform Seven-Alpha,” Chen said without hesitation. “One of three that survived the war in operational condition. The other two are in degraded states — I’ve been unable to reach them for maintenance. Seven-Alpha I maintain remotely. It gives me a view of the inner solar system at useful resolution.”

“Three years,” Colman said. “You’ve been watching us for three years.”

“Watching and thinking,” Chen said. He opened a door into what had been a lecture hall and was now a planning room — maps on the walls, handwritten data sheets pinned beside them, a large display that was currently showing weather patterns over the region. “Please sit down. I’ll get coffee.”

This was a specific detail. Chen personally went to the side table and poured coffee. He did not signal to someone else to do it. He did it.

They sat. The coffee, when it came, was excellent.

“The Mountain State has a functioning coffee roasting operation,” Lechat said, with a tone that conveyed appreciation.

“It matters,” Chen said. He sat down. “Small things that work matter more than large things in theory. I learned this early.” He looked at his cup. “In year one, I had six hundred and twenty thousand people and shrinking supplies and two options. The first was to share the supplies equally, which would have produced a slightly more comfortable die-off over approximately eighteen months. The second

was to triage, which required deciding who lived and who had reduced access.” He said this without particular weight — as fact, not confession. “I chose the second. It was the right decision given the information I had and the options available to me.”

“How did you decide the triage criteria?” Lechat asked.

“Skill sets required for community survival, first. Age and health as secondary factors — young and healthy people with applicable skills received priority. People without applicable skills received standard allocation, which was sufficient to survive on.” He paused. “Some people were unable to meet the physical requirements of what needed doing, for reasons of age or prior medical condition, and were on reduced allocation. I will not pretend the reduced allocation was comfortable.”

“How many people died in year one?” Colman asked.

“Of the original six hundred and twenty thousand, approximately forty thousand died in year one. By year two we had stabilized. The annual death rate has been approximately eight thousand since then, which is below the pre-war actuarial rate for this population under non-crisis conditions.”

“The triage decision in year one saved hundreds of thousands of lives,” Lechat said.

“Yes,” Chen said. “And it required me to make decisions that I was not authorized to make by any legitimate authority, that most ethical frameworks would condemn, and that I made unilaterally with full awareness of all of that.” He looked at Lechat. “I mention this because I suspect your Chironian principles have an assessment of my methods.”

“We have an assessment,” Kath said. “We also recognize the complexity of the situation.”

“What is the assessment?”

“That you saved six hundred thousand people,” Kath said. “And that the method you used to do it created a structure that may be very difficult to change.”

Chen nodded slowly. “Yes,” he said. “That’s correct.” He set down his cup. “The proposal.”

“Yes,” Lechat said. “The proposal.”

“The Mountain State has an archive,” Chen said. “Pre-war institutional records from three universities, two federal research facilities, and the EAF’s North American military technical library. The archive is approximately four hundred and twelve terabytes of organized and indexed material. It includes the complete engineering library of MIT and Stanford as they existed in 2040, the complete medical library of Johns Hopkins, and approximately ninety terabytes of classified military research that I have had eleven years to review and assess.” He looked at them. “Not all of it is useful. Some of it is weapons research I have no intention of sharing. But the materials science, the physics, the engineering, the medicine — I believe it is the largest organized collection of pre-war technical knowledge in the northern hemisphere.”

“And the proposal,” Lechat said again.

“Use the Mountain State as your operational base for the northern hemisphere,” Chen said. “Use our infrastructure, our logistics, our communications network. In exchange, I receive access to your fabrication technology and the technical knowledge base of the Chironian civilization.” He paused. “A fair exchange of what each party has that the other needs.”

The room was very quiet.

“There’s a problem with this proposal,” Colman said.

“I know,” Chen said. “Tell me what you see.”

“If we operate from your base, we become your guests. Our presence here is branded by your authority. Every other community on Earth sees us as associated with you — with the Mountain State’s organizational model, its history, its methods.”

“Yes,” Chen said.

“That’s not a problem we can accept.”

“I know,” Chen said again. He was not troubled by this. He had the quality of someone who has thought through the objection already and is interested in the specific form in which it’s being raised. “What would you propose instead?”

“The archive,” Lechat said. “We’d like the archive. Unconditionally, shared with all communities simultaneously.”

Chen looked at him. “That’s not how I described the exchange.”

“I know. But it’s what the exchange would become if we don’t make it explicit now.” Lechat’s voice was patient and completely firm. “The archive belongs to no one. It’s pre-war knowledge. It belongs to the people who can use it. If it’s available only to communities that engage with you on your terms, it becomes leverage. You’re too smart not to know that.”

Chen was quiet for a very long moment. He was looking at Lechat with the expression of someone who has been precisely and accurately read, and is deciding what to do with the accuracy.

“You know what I think about giving away everything unconditionally,” he said.

“I think I do,” Lechat said.

“Scarcity is real. It was real before the war and it was real after the war and it will be real in twenty years. The people who pretend it isn’t don’t understand the foundational constraint of human existence.” He looked at Kath. “With all respect to your civilization and its genuinely extraordinary achievements.”

“Our civilization,” Kath said, “has not eliminated scarcity. We’ve eliminated artificial scarcity. The difference matters.”

Chen looked at her. “Explain.”

“Scarcity exists when demand exceeds supply. On Earth, for most of human history, the demand was real and the supply constraints were real. But the allocation mechanisms — the systems by which available resources were distributed — were not optimized for meeting the demand. They were optimized for maintaining the power of the people who controlled the allocation.” She paused. “On Chiron, we have enough of everything to meet demand. That’s not magic — it’s the result of fabrication technology and several generations of development. The key insight is that abundance created by that technology made the allocation mechanisms obsolete. There was nothing left to fight over.”

“And your proposal is that Earth can achieve the same condition.”

“Not immediately,” Kath said. “But the fabricators are the beginning of the path. Not the end.”

Chen looked at her for a long moment. Then he looked at his hands. Then he looked at the map on the wall — the Mountain State’s territory, outlined and annotated with the data he had accumulated over eleven years.

“The archive,” he said. “Not unconditionally. But I’ll agree that it should not be held exclusive to communities that deal with us.”

“Is that a yes?” Lechat asked.

“It’s a movement toward a yes,” Chen said. “I need time to review the specific terms.”

“Fair,” Lechat said.

“But I want something in return for it. Not as leverage. As a genuine exchange.” He looked at Kath again. “I want one of your people to stay here. Not in the Mountain State generally — here, with me. Someone with the full technical background. Someone I can have actual conversations with, over the long term, about what you know and what we need to learn.”

Kath said: “We already have volunteers to stay.”

“One of them, here.” A pause. “The engineer. Linh Nguyen.”

There was a moment of silence.

“Why Linh specifically?” Colman asked.

“Because she’s the one who understands what I built and why,” Chen said. “And because she’s the one who will tell me honestly when it’s wrong.” He looked at the table. “I’ve been living inside this system for eleven years. I need someone who can see it from outside without being afraid of it.”

Chapter 21: The Problem with Abundance

The fabricators came online across the major communities in a staggered sequence over the following six weeks. Nelson, then Wellington, then Christchurch in New Zealand. Sydney and Melbourne in Australia. Montevideo in South America. Fort Collins in the Mountain State. Innsbruck and Turin in the Vale Federation.

Each installation had a slightly different reception.

In Nelson, the installation had already been integrated into the community's rhythm — it was there, it was working, it was not owned by anyone in particular, and the initial rush had settled into a pattern of use that was functional if not yet natural.

In the Mountain State, Chen's team received the fabricator units with the efficient professionalism of people who had been briefed thoroughly on what to expect and had organized accordingly. The units went into the facility that had been prepared for them. The personnel trained on their operation within four days. The first production runs were immediately allocated to specific deficit items in the Mountain State's supply inventory.

This was the problem Colman had anticipated.

In Nelson, open access had produced a first week of queuing and some friction, followed by a gradual reduction in the urgency of access as people began to understand that the resource was not going to run out. The friction was real and occasionally heated, but it was short-lived, because the fabricator kept producing, and a resource that keeps producing regardless of who's in line for it is a resource that can't be effectively monopolized.

In Fort Collins, there was no queuing and no friction, because there was no open access. The fabricator's output was integrated into the Mountain State's existing allocation system. The system was equitable and well-managed — Chen ran it with the same precise fairness he applied to everything. But it was managed, which meant it was mediated, which meant it was still, in some fundamental sense, his.

Colman raised this with Chen directly, on the third day after the fabricator installation.

"Your allocation system is fair," Colman said.

"As fair as I can make it," Chen said.

“And managed.”

“Of course managed. How else would you run it?”

“The same way you’d run a public water supply in a city that has water,” Colman said. “You’d leave the tap on and let people use it.”

Chen looked at him. “A city that has water also has the infrastructure to maintain the supply and the social organization to prevent waste and abuse. Which requires management.”

“The fabricator doesn’t waste,” Colman said. “It can produce until the feedstock runs out, which at current supply levels is not a constraint.”

“People will ask for more than they need,” Chen said. “They’ll stockpile. They’ll feel entitled to more than their share because they can.”

“And if you let them stockpile?”

“Then the people who stockpiled have more than people who didn’t, which creates inequity, which creates resentment.”

“And if you don’t let them stockpile?”

“Then they have what they need and nothing extra, which is the situation I’ve been maintaining for eleven years and which is both stable and gently resented.” He paused. “Scarcity management is always resented. There’s no version of it that doesn’t produce resentment.”

“That’s because the management is the problem,” Colman said. “Not the scarcity. The scarcity was solved by the fabricator. What you have now is management of a non-scarce resource, which is a different thing from management of a scarce one.”

Chen looked at him with the expression he used when he was parsing an argument carefully before responding. “You’re saying the management itself generates the sense of scarcity.”

“I’m saying the management implies that scarcity is still present, which makes people act as if it is.”

“And if I remove the management, people stop acting as if scarcity is present.”

“Eventually,” Colman said. “With some friction in the interim.”

Chen was quiet for a long time. Outside, the Fort Collins facility hummed with its organized efficiency. People moved through the corridors with the purposeful economy of people who had learned to not waste motion. It was, Colman reflected, a beautiful system. It was also a system organized around the ongoing management of deficit.

“The transition period,” Chen said.

“Yes.”

“What happens during the transition period if I step back from the management?”

“Some people stockpile,” Colman said. “Some people feel anxious and take more than they need. Some people continue to use the system as they always have. Over time — weeks, months, maybe longer — the stockpilers discover their stockpiles are redundant because the fabricator keeps producing, and they stop stockpiling. The anxious people discover their anxiety is not predictive of shortage, and they relax.”

“And the people who were doing their allocation responsibly all along?”

“They continue.”

“And if someone figures out a way to monopolize the feedstock — to control the inputs, to control the machine itself?”

“Then the six Chironian volunteers who are here address the problem,” Colman said. “That’s part of what they’re here for. Not to run the machine. To make sure no one else runs it either.”

Chen sat back. He looked at the ceiling. It was a particular look — the look of someone who has spent eleven years making one kind of decision and is being asked to understand a different kind. “This requires a faith in the process that I am not yet able to access,” he said.

“I know,” Colman said.

“I have evidence that my method works. Six hundred thousand people alive.”

“Yes.”

“You’re asking me to change the method based on evidence that’s not available yet.”

“Based on a principle,” Colman said. “The evidence will follow.”

Chen looked at him. “That’s a Chironian answer.”

“It is.”

“I find Chironian answers dissatisfying,” Chen said. “They require trust in a process rather than trust in a person.”

“Trust in a process is more durable,” Colman said.

“Trust in a process is more abstract,” Chen said. “Trust in a person — in me, specifically — kept six hundred thousand people alive.” He paused. “I am aware of the problems this creates. I’m also aware of the results.”

“We’re not asking you to stop being trustworthy,” Colman said. “We’re asking you to trust a system rather than relying on your trustworthiness as a substitute for a system.”

This landed somewhere. Colman could see it landing — the specific quality of recognition that a new framing produces, the slight reconfiguration of posture that indicated he was taking it in rather than rejecting it.

“I’ll think about it,” Chen said.

Which from Chen was not a deflection. It was exactly what it said.

Chapter 22: The Archive

Chen’s proposal on the archive was finalized seventeen days after the initial conversation, in a meeting that included Lechat, Colman, Kath, and, in the specific choice that was characteristic of Chen, no one else.

“The archive will be made available,” Chen said. “To all communities, in full, without restriction. I will provide the indexing and the technical annotation we’ve developed, which makes the raw files navigable.” He looked at the table. “I want it on the record that I consider this a significant concession. And that I’m making it because the argument is correct, not because I was pressured.”

“Noted,” Lechat said.

“There is a condition,” Chen said.

“What condition?” Colman said.

“The archive transfer is coordinated by the Mountain State. We maintain the master copy, we manage the distribution, we provide the annotation.” He looked at Lechat. “Not as leverage. As a practical

matter — the infrastructure for this kind of large-scale data transfer is here, and the annotation work has been done here.”

“Who oversees the transfer to make sure everything is included?” Kath asked.

“Your people,” Chen said. “Any technical team you want. Full access to the archive facility, full ability to verify completeness.”

“Linh Nguyen,” Kath said.

Chen looked at her. “Yes. Linh Nguyen.” He paused. “She’s staying.”

“She’s made that decision,” Kath said.

“Yes. I know.” He was quiet for a moment. “I want to be clear about something. I am not offering this exchange because I expect reciprocity in the Chironian sense — resources for resources, freely given and freely received. I’m offering it because in eleven years of running a command economy, I have learned that information is the one resource where controlling access actively destroys the value of what you control.” He looked at his hands. “A soldier who understands what to do is more useful than ten soldiers who are following orders. A community that understands why the allocation is structured the way it is maintains the structure better than a community that’s told to follow it.”

“That’s a Chironian principle,” Kath said quietly.

“It may be,” Chen said. “I arrived at it from the other direction.”

“The principles often converge,” Kath said. “The problem is usually the path.”

Chen looked at her. “We’ll have a long time to discuss the paths,” he said. “You’re leaving someone. I’m receiving them.” He paused. “That means there’s a relationship that doesn’t end when your ship leaves.”

“It does,” Kath said.

“What do you expect from it?”

“Nothing,” Kath said. “What do you expect from it?”

He thought about this for a long time — longer than his usual processing pauses, which were already longer than most people’s. “I expect it to be uncomfortable,” he said. “In productive ways.”

“Probably,” Kath said.

“And I expect that in two years, when you come back for your volunteers, the Mountain State will look different in some ways and the same in others. And I’m genuinely uncertain which parts will have changed and which won’t.”

“So are we,” Kath said.

“Good,” he said. “That makes two of us. The uncertainty is where the useful work lives.”

Chapter 23: The Vale Federation

The emissary from the Vale Federation arrived in Nelson on day forty-seven. She came on foot — or rather, she came by a combination of the Southern Reach’s internal transport system and a shuttle flight that the Congreve’s team had arranged, which was itself a demonstration of the beginning of connectivity between communities.

Her name was Professor Anya Schafer, and she was sixty-eight years old, and she had the specific quality of a person who has spent fifty years teaching and is still fascinated by everything. She was a physicist who had become, of necessity, a historian and administrator and resource manager and general troubleshooter for

the Vale Federation's central university in Innsbruck. She wore the layered practical clothing of mountain life — wool and waterproofed fabric — and carried a battered satchel that contained, she explained, the summary documents of the university's current research program and the course catalogue for the next academic year.

“I brought the catalogue,” she said, “because I thought you might want to know what we're doing and not just what we have and what we need.”

This was, Colman thought, characteristic of the Vale Federation's way of seeing itself. They were not primarily a surviving population or an organized community or a political entity. They were a knowledge tradition.

“What are you teaching?” Kath asked.

Professor Schafer opened the satchel and produced the catalogue — an actual printed document, hand-bound, with a cover that someone had clearly spent time making look dignified. “Engineering and applied physics — reduced curriculum, but core principles. Medicine. Biology. History, quite a lot of history, because understanding how we got here seems more important than it did before.” She paused. “Agricultural science. Ecology. And we have a literature program that is full, which surprised me but on reflection makes complete sense — when material conditions are constrained, people want stories.”

“How many students?” Colman asked.

“Currently enrolled: two hundred and eleven. Graduates in the last ten years: approximately four hundred, most of whom are working in technical roles in the Vale Federation communities.” She looked at them. “Our constraint is not student quality. We have excellent students — people who come to us because they're already intellectually serious, because in a post-war environment, frivolous people don't seek out universities. Our constraint is faculty depth,

library resources, and the fact that we are, very literally, isolated from everywhere else.”

“We can address the isolation,” Lechat said.

“That’s why I came,” Schafer said. “The Southern Reach reached out two years ago. The communications are good. But communications are not the same as exchange. If you can move people—”

“We can move people,” Lechat said. “We can move materials too.”

“What do you need from us in return?” she asked. This was the same question Vasquez had asked. It was, Colman was beginning to understand, the question that every Earth survivor asked first, from long habit.

“Your knowledge tradition,” Kath said. “Not as payment. As a thing that we’d like to help preserve and expand.” She paused. “On Chiron, we lost a great deal in the founding generation — the cultural transmission that happens when an old civilization passes its accumulated wisdom to a new one. We built from scratch. That has advantages and disadvantages. The advantage is that we carry no harmful legacy assumptions. The disadvantage is that there are things we had to rediscover that were already known, and some things we may not have rediscovered yet.” She looked at the catalogue. “The humanities, especially. The ways of thinking about human meaning that don’t reduce to technical problems.”

Schafer looked at her with the expression of an academic who has been paid a very specific compliment. “You want our literature program,” she said.

“I want your literature program,” Kath said. “And your history program. And I want you to come to Chiron, if you’re willing, and bring some of your faculty. Because the things you’ve preserved under catastrophic conditions are things Chiron has never been tested on.”

Schafer was quiet for a moment. She was looking at Kath with the expression of someone who is revising their model of the situation. “You came here to study us as much as to help us,” she said.

“Yes,” Kath said. “Both are genuine.”

“All right,” Schafer said. She closed the catalogue and put it back in the satchel. “Let’s work out the logistics.”

Chapter 24: Mara’s World

Mara Petrov kept a notebook.

This was the first thing Alex had learned about her, on their first tour, and it had turned out to be the key to understanding her. The notebook was not a diary — there were no feelings in it, or almost no feelings. It was a log. Numbers, observations, patterns. The water allocation for the week. The clinic supply status. The estimated harvest date for the northern plots. The count of days until the next supply transit.

She had kept notebooks since she was seven. The current one was the fourteenth.

“Why fourteen?” Tomas asked, on the third day they spent together.

“The first thirteen filled up,” Mara said, as if this were obvious.

“What happened to them?”

“I have them all. They’re in a box in my room.” She looked at him.

“My mother says they’re the most accurate continuous record of Nelson’s supply situation that exists, because the council records have gaps.” A pause. “The council records have gaps because the people who maintain them sometimes record what they want to be true instead of what is true.”

“That happens where you’re from?” Saan asked.

“It happens everywhere,” Mara said. “When the truth is uncomfortable, some people change the record rather than address the truth.”

“Why doesn’t your mother’s notebook have that problem?” Alex asked.

Mara looked at him. “Because it’s mine,” she said. “Nobody sees it except me. There’s no audience to write for. I just write what’s there.”

This was the core of it, Alex thought. The notebook was the only thing in Mara’s world that was entirely private. Everything else — the food, the medicine, the water, the decisions — was mediated by the community, by the council, by the supply system. The notebook was the one space that was only hers.

He understood this in a way that surprised him. On the ship, on Chiron, everything was in some sense available — not managed in the sense of rationed, but present and shareable. Mara had something he didn’t quite have, in her private documentation: a relationship to information that was entirely self-determined.

“Could I see it?” he asked.

She looked at him for a long moment. This was the kind of look that had weight behind it — not suspicion, exactly, but evaluation. The same look she’d given him when they first met.

“Parts of it,” she said. “I’ll decide which parts.”

“Fair,” he said.

She opened the notebook to a section from three weeks earlier — before the Congreve’s arrival, in the specific days when the

community had known the ship was in orbit but had not yet had direct contact. The entries were brief and dense.

Day 1 of orbit: Water allocation normal. Clinic supply at 6 days. Ship confirmed in 621km orbit per Northern Observatory. Council meeting Thursday.

Day 2: No change in supplies. Community meeting on ship question attended by approximately 300 people. Main questions: medical supplies? Will it stay? Who controls the relationship?

Day 3: Council issued statement. 'Precautionary protocols' — unclear exactly what this means. Ship has not made contact on our frequency yet.

Day 4: Ship transmitted on open frequency. Council received the message. I don't know the content yet. The chair's face when she left the session looked — not alarmed. Thinking.

Alex read through the section. The last entry before the first landing read:

Day 11: Tomorrow they land. Clinic supply now at 9 days because we're holding back non-critical prescriptions. Water allocation unchanged. I am trying to decide what I want from this. I want medical supplies, obviously. I want to not be afraid of the supply situation for one day. I want to talk to the people who don't have to be afraid of it, and find out what that's like.

He closed the notebook and looked at her.

"You're afraid a lot," he said.

"Yes," she said.

"The supply fear?"

“Mostly. The background one, the one that’s always there — what if something goes wrong, what if we run short, what if the council is not telling us everything.” She paused. “I know it sounds anxious. It is anxious.”

“But it’s also correct,” he said. “The worry is not irrational.”

“It’s completely rational,” she said. “That’s why it won’t go away. It’s not a thing I can argue myself out of.”

“Because it’s based on evidence.”

“Yes.”

Alex thought about this. On Chiron, the background fear was different — not about supplies, but about meaning, about purpose, about the specific anxieties of a civilization that had everything material and was working out what to do with the freedom. Different content, same structure. The worry that something important might be missing.

“I have a question,” he said.

“Okay.”

“The council asked you to report on us,” he said. Not as an accusation. As a fact he was checking.

Mara went very still.

“How did you know?” she said.

“You’re eleven and you’ve been spending time with us every day for three weeks,” Alex said. “That’s unusual attention for a kid. And the council is trying to understand what we’re like. It makes sense that they’d ask someone who’s good at observing to observe.” He paused. “The notebook is your qualification.”

Mara looked at him for a long time. He could see her assessing the options — deny it, confirm it, deflect. She was doing the calculation.

“Yes,” she said, finally. “They asked me to note what you talk about. What you’re interested in. Whether you seem honest or whether there’s a gap between what you say and what you do.”

“And your report?” he asked.

She almost smiled. Not quite. “That you’re honest,” she said. “And that what you’re interested in is mostly questions, not answers. And that you’re not what anyone expected.”

“What did they expect?”

“Something more — official,” she said. “More concerned with being important.”

“We’re not important,” Alex said. “We’re just from somewhere different.”

“That’s what I reported.” She closed the notebook. “Are you angry?”

“No,” he said. “It’s useful information for the council to have.”

She looked at him. “You’re not going to tell me to stop?”

“It’s your decision,” Alex said. “I’m going to keep talking to you. And you’re going to keep writing down what you observe. And the council is going to keep getting reports.” He paused. “As long as the reports are accurate, I don’t have a problem with it. You’re not going to lie about what you see.”

“No,” she said.

“And accurate information about us is good for your community,” he said. “It helps them make better decisions about how to work with us.”

Mara was quiet for a moment. Then she said, with something that was more genuine than her usual controlled delivery: “You knew the whole time.”

“We figured it out the first week,” Alex said.

She looked at her notebook. Then at him. Then at something in the middle distance that was probably the reorganization of a category. “You’re very strange,” she said.

“You’re very useful,” he said, which was not a compliment in the form she was used to but which he clearly meant as one.

The Security Council’s position within the Southern Reach’s governance was, by the fourth week of the Congreve’s visit, becoming complicated.

The Security Council was a permanent body — one of the few in the Southern Reach’s governance structure that had not been subject to term limits or rotation. It had been established in year one as a response to the specific threats of that period: resource conflicts between communities, external threats from desperate groups, internal instability from the shock of the holocaust. It had been necessary, and it had done its work, and it had the specific quality of bodies that have been necessary for a long time: it had become structural rather than situational. It no longer asked whether its scope was appropriate, because the question had stopped occurring to it.

The head of the Security Council was a man named Orin Baxter, sixty-seven, who had been an intelligence analyst before the war and who had spent eleven years building the Southern Reach’s information systems. He was good at his job. He was also deeply uncomfortable with the Congreve.

Colman identified this discomfort on day nineteen, in a meeting about fabricator placement logistics, when Baxter asked a question that was technically about security protocols but was actually about something else.

“If the fabricators go into community facilities,” Baxter said, “and community members have unrestricted access, we have no visibility into what’s being produced.”

“No,” Colman said.

“The fabricators can’t produce weapons, you said.”

“Nothing that meets the definition of a dedicated weapon. They can produce tools that can be misused.”

“Like what?”

“Any solid object can be misused as an impact weapon,” Colman said. “You’re not going to control that.”

“I understand that. I’m asking about less obvious applications. What if someone uses the fabricator to produce components of a system that, assembled, becomes a weapon?”

“The fabricator’s AI monitors for recognized weapon system components,” Colman said. “If it detects a request pattern consistent with weapon assembly, it flags it and refuses.”

“And the flag — who receives it?”

“The monitoring system logs it. We have access to the logs. Your community can have access to the logs too.”

“I want access to the logs,” Baxter said. “Specifically, I want to know who requested what and when.”

“The logs show what was requested and produced,” Colman said. “They don’t show who made the request.”

Baxter looked at him. “Why not?”

“Because the fabricator was designed to provide privacy to its users,” Colman said. “The record of what was made is a community resource. The record of who made what belongs to the person who made it.”

This was precisely the answer that Baxter found most difficult. His instinct, trained over eleven years, was toward visibility — knowing who did what, maintaining the ability to trace actions back to individuals. It was the intelligence analyst’s baseline preference, and it had been adaptive in the Southern Reach’s early years, when accountability was genuinely important for community stability.

“I need to know what’s happening in my community,” Baxter said.

“You’ll know what was produced,” Colman said. “Not who produced it.”

“That’s not sufficient.”

“For what?” Colman asked.

Baxter paused. “For—” He stopped. “For maintaining community security.”

“What threat are you trying to anticipate?” Colman asked.

“Specifically.”

Another pause. “I don’t know specifically. That’s the nature of security — you try to anticipate threats before they materialize.”

“And if you had the user records,” Colman said, “and you found something that looked concerning — how would you respond?”

“I’d investigate.”

“And the investigation would—”

“Would follow appropriate channels,” Baxter said.

“Appropriate channels,” Colman said. “Which means it would be managed by the Security Council, which doesn’t have term limits or rotation.”

Baxter looked at him. The look was controlled but not comfortable.

“The privacy policy is not negotiable,” Colman said. “It’s not a preference — it’s designed into the system. We can share the aggregate production logs. We can’t provide individual access records.” He paused. “If that’s a constraint you can’t work with, we should discuss it openly.”

Baxter was quiet for a long time. The meeting concluded shortly afterward, without resolution on this specific point.

Colman wrote a brief note to Lechat that evening: *Baxter is going to be a problem. Not immediately. Worth watching.*

Chapter 25: The Fracture

The signs were there three days before anything happened.

Colman had been reading signs for a long time — military training, eleven years on Chiron, two months on Earth, and the specific sensitivity to anomalous behavior that came from spending weeks with a population that was managing stress in multiple directions simultaneously. You learned, in that context, to read the behavior of groups the way Bernard read the behavior of complex systems: looking for the indicators that didn’t fit the expected variance.

The first sign was a change in Baxter's meeting behavior. He stopped attending the joint coordination sessions between the Congreve team and the Southern Reach Council. His absence was explained as scheduling conflict, but the pattern of absences was not random — he was present for sessions that were primarily informational and absent for sessions that were operational. He was avoiding situations where he would be expected to act on decisions he hadn't made.

The second sign was a change in the composition of the Security Council's staff. Two people who had been visible at various facilities over the previous weeks were now less visible. Not absent — but at different locations, doing different things.

The third sign was Mara's notebook.

She showed him an entry from three days earlier. *Council meeting ran long — three hours instead of the scheduled one. Mother wouldn't say what was discussed. She looked tired in a specific way. Not the regular tired. The other kind.*

“What's the other kind?” Alex asked.

“The kind where she's made a decision she doesn't entirely agree with,” Mara said. “She looks like that after council votes where she was in the minority.”

“Your mother sits on the council?”

“Health Board, which reports to the council. She's in the sessions sometimes.” Mara looked at the entry. “Something was decided three days ago that she didn't agree with.”

“Do you know what?”

“No. She won't tell me things the council considers confidential.” A pause. “But I've been observing the Security Council staff for a week and there's something wrong. The movement patterns are wrong.”

Alex looked at her. “What do you mean?”

“I mean—” She pulled another page of the notebook toward him. “Here. The Security Council facility is on the north side of the settlement. I pass it twice a day on my way to school and back. For two months I’ve noted who’s there and when. The pattern is normally regular — same people, similar times, predictable rotations.” She pointed to the last three days of entries. “This changed three days ago. More people at the facility late at night. Different people. Some of them I don’t recognize.”

“Different how?”

“Physically different,” she said. “Not from Nelson. Possibly from Wellington — some of the Wellington community members who come for council meetings stay at the accommodation near the facility, and their movement pattern matches people in transit rather than people stationed here.” A pause. “But they’re not in the council accommodation. They’re in the facility overnight.”

“Which is unusual,” Alex said.

“Which is unusual,” Mara confirmed.

Alex was quiet for a moment. “Does the Congreve team know?”

“I’m telling you,” Mara said.

“I mean officially.”

“I don’t know what officially means in this context.”

“Neither do I,” he said honestly. “Okay. I’ll tell my father.”

He told Colman that evening.

Colman listened carefully, asked three questions, and then sat with the information for a moment. Then he went to find Kath.

Kath listened, asked one question, and then went to find Lechat.

Lechat listened, asked no questions, and went to find Bernard.

The chain of conversations took approximately an hour. At the end of it, a small group was assembled in the community building that served as the Congreve team's base — Lechat, Colman, Kath, Linh, and two Chironian security specialists named Fen and Juren whose skill sets had not been prominent during the voyage but who had been, Colman now understood, one of the reasons they'd been selected.

“The Security Council is planning something,” Lechat said. “We don't know what.”

“Baxter's goal is access,” Colman said. “He wants the fabricators under his control. The user-level privacy policy is what he specifically objected to — not theoretically, practically.”

“He's going to try to take control of the fabricators,” Kath said.

“Or the ship,” Fen said.

A silence.

“The ship is in orbit,” Bernard said.

“Yes,” Fen said. “Which means he can't take the ship. He can try to hold the people on the surface. As leverage.”

“Leverage for what?” Colman asked.

“For the fabricators,” Fen said. “Or for access to the fabricators' output. Or for something else they want that they've decided they can't get through negotiation.”

“How do we know they've decided that?” Lechat asked.

“We don’t, with certainty,” Fen said. “But Mara’s observation suggests a significant organizational action in preparation. The overnight staffing at the Security Council facility, the Wellington people in non-standard accommodation — that’s the pattern of people who are preparing to do something that requires coordination and needs to be kept quiet.”

“When?” Lechat asked.

“Days, probably,” Colman said. “Not weeks. The pattern of preparation has a timeline.”

“How do we respond?” Bernard asked.

Colman looked at Kath. Kath was looking at something in the middle distance — not the inattention of distraction, but the specific focused quality of someone working through options.

“We don’t respond,” Kath said. “Not the way the question implies. We don’t preempt it, we don’t confront them, we don’t try to prevent it.”

“We let it happen?” Bernard said.

“We prepare for it,” Kath said. “The way the ship was prepared.”

Bernard was quiet for a moment. “Ah,” he said.

“Ah?” Colman said.

“The ship,” Bernard said. He said it with a specific quality — the specific quality of someone remembering something that had been designed into the system before departure and which was now relevant. “Do you want me to—”

“Yes,” Kath said. “Please.”

Colman looked at them. “What about the ship?”

“Get some sleep,” Kath said, with the warmth she used when she was being honest about something she was not ready to fully explain. “Everything is going to be fine.”

He looked at her. He recognized the specific quality of this exchange — the Chironian habit of not volunteering information that was actionable but not yet needed. He also recognized, having lived with this for eleven years, that she was right about sleep.

“All right,” he said.

Chapter 26: The Philosophical Heart

The meeting between Chen and Lechat that Kath had been suggesting for three weeks finally happened on day fifty-eight of the Earth visit, in the planning room at Fort Collins that had become, by default, the space where significant conversations took place.

Chen had requested that the meeting be just the two of them. Colman was not present. Kath was not present. No aides or observers.

He learned what was said later, from Lechat, who told it with the precision and completeness that characterized his communication of important events.

They had been talking for four hours.

“He started with the question I expected him to start with,” Lechat said. “He asked why the Chironians bothered. Why — given that their civilization is stable, sustainable, has no resource constraints, has solved all the problems that produced the war — why come back at all?”

“What did you say?” Colman asked.

“I said it was a choice. Not an obligation. A choice made by people who thought the right thing to do was to come, so they came.” Lechat paused. “He found this unsatisfying. He said: ‘On Chiron you don’t need anything from Earth. You have a better civilization by every material measure. Why spend six years going somewhere worse?’”

“What did you say?”

“I said I wasn’t sure we had a better civilization by every measure. That there were things we might have lost by having the blank slate — things that were only knowable by having survived difficult conditions, which we hadn’t.” A pause. “He thought about this for a long time.”

“And then?”

“And then he said: ‘What do you think you might have lost?’ And I told him what Kath had said to Schafer — the humanities, the question of meaning, the ways of thinking about human experience that aren’t reducible to technical problems. And he said—” Lechat stopped. He had the expression of someone encountering an observation they were still processing. “He said: ‘The things you think you lost are the things I had to give up to keep six hundred thousand people alive. Ethics. Accountability. Consent. The right of individuals to choose the conditions of their own survival.’”

“He gave them up consciously,” Colman said.

“Completely consciously. He said: ‘I am not a good man. I know exactly what I am. I’m a man who made a decision that a good man couldn’t make, that needed to be made, that nobody else was going to make, and I’ve been living with it for eleven years.’” Lechat was quiet for a moment. “He said it very quietly. Without self-pity. Without the dramatic quality of confession. It was just — accurate.”

“What did you say?”

“I said I thought he was wrong about one thing. I said I thought the decision he made in year one was the decision a good man makes when the good options have run out.”

“And?”

“He said: ‘That’s generous. But it misses the point.’ And then he said —” Lechat looked at his hands. “He said: ‘The point is not whether the decision was correct given the available information. The point is whether the structure I built around the decision, and the authority I consolidated to make the decision and execute it, can be reformed now that the material conditions have changed. And my honest answer is: I don’t know. Because the structure is useful. And I’m still in it. And I’m not certain I’m capable of dismantling it.’”

Colman was very quiet.

“He said,” Lechat continued, “I can see exactly what you’re offering and exactly what it requires. It requires me to become something I may not be able to become, which is a man who trusts a process rather than himself. A man who believes the system will work without his personal oversight. And in eleven years, every time I’ve tried to believe that, something has gone wrong in a way that required me to step in.’ He paused. ‘And I don’t know,’ he said, ‘whether the things that went wrong were catastrophes that required intervention, or whether they were normal variance that would have resolved itself, and my intervention prevented the learning process that would have eventually produced better outcomes.’”

“He’s asking whether he’s been necessary,” Colman said.

“He’s asking whether he’s been an obstacle,” Lechat said. “And he can’t answer the question because he’s inside the system he built.” He was quiet for a long moment. “I’ve never heard someone be that honest about their own limitations.”

“What did you say to him?”

“I said I didn’t know either. And I said that was the most honest answer I could give, and that it was the right answer to give, because anyone who was certain was wrong.” He paused. “He thought about that for a long time. And then he said something—” He stopped again. He had the quality of someone who has been given an answer they’re not sure how to carry. “He said: ‘The Chironian model works because it was built by people who never learned to want the power that organizing people provides. I know what that power is. I know what it feels like. I know that it’s justified by results and that the justification is genuine. And I also know that the feeling and the justification are separate things, and that the feeling was there before the results justified it. And I’ve never been able to separate them.’ He paused. ‘And so I don’t know,’ he said, ‘whether my continued authority is about keeping the Mountain State functional, or whether the Mountain State’s continued need for my authority is a consequence of a system I built that reflects my preference for the power it gives me.’”

The room was very quiet for a long time.

“He’s aware that he might be the problem,” Colman said.

“He’s aware that he can’t know whether he’s the problem,” Lechat said. “Because he can’t be outside himself to check.” He looked at Colman. “And we couldn’t tell him either. We could see it from outside, but we don’t know the inside, and the inside is the part he needs to understand to change it.”

“What did the meeting resolve?”

“Nothing,” Lechat said. “Both of us knew it wouldn’t resolve anything.” He paused. “That was the point. He asked for the meeting knowing it wouldn’t resolve anything. He needed someone to have the conversation with. Someone who would hold the whole thing clearly without trying to solve it.”

“And could you do that?”

“I tried,” Lechat said. “I don’t know if I managed.” A long pause. “He’s the most remarkable person I’ve met on this planet. And possibly one of the most honest.”

“He’s not going to change,” Colman said.

“Maybe not,” Lechat said. “But he knows exactly what he is. And that’s more than most people manage.”

PART FIVE: THE LONG GAME

Chapter 27: The Ship Is Unavailable

The attempted boarding happened on a Thursday morning, which was the Southern Reach's early autumn and which produced a cool, clear dawn with the particular clarity of a high-pressure system over the coast.

Forty-seven people, organized by Baxter's Security Council, attempted to access the Congreve's shuttle bay at 0400 when the watch was light and the Southern Reach administrative staff was not yet in their offices. They had two shuttle-class vehicles from the Southern Reach's own fleet — small atmospheric craft capable of reaching low orbit — and they had, apparently, a reasonable amount of intelligence about the Congreve's docking procedures.

What they did not have was access.

This was the first thing they encountered. The Congreve's standard docking protocols required an active authentication code from the ship's personnel roster. Any incoming vessel was held at five hundred meters until an authenticated crew member provided clearance. This protocol had been in place since the ship was built.

What Baxter's team had apparently assumed was that with enough personnel on the ground and a credible approach — acting quickly, presenting themselves as official — they might be able to rush the authentication process or find a workaround.

They had not anticipated that the Congreve had no workaround.

The shuttle vehicles reached five hundred meters from the docking bay. They stopped. The Congreve's automated system requested

authentication. None was provided.

They tried for forty-five minutes. During those forty-five minutes, they received a series of calm, precisely worded messages from the ship's communications officer explaining the authentication requirement and offering to connect them with Commander Lechat, who was available and ready to speak with them.

They also found that the docking bay had an unexpected configuration — the bay doors were not where they had been documented in the pre-war information about the original Mayflower II. The conversion had moved them.

And the ship's AI, which had an extensive set of navigation protocols for orbital operations, had apparently decided that the optimal response to unauthenticated craft in the dock approach zone was to rotate the ship to a position that placed the bay on the far side from the approaching vehicles, requiring them to travel around the ship's circumference, during which travel the vehicle controls reported sluggish response, as if something in the electromagnetic environment was affecting their systems.

“The ship was designed this way,” Kath had told Lechat. “Before we left.”

The boarding attempt was abandoned after two hours. The shuttle vehicles returned to the surface. Baxter sent a formal communication to Lechat requesting a meeting.

The meeting was granted.

At the meeting, Lechat said three things.

The first was: “We know what you tried and why. We're not angry.”

The second was: “The fabricators remain available to the Southern Reach community on the terms we established. That doesn't

change.”

The third was: “If there’s something specific you feel you need from us that you haven’t been able to get through the existing channels, I’d like to understand what it is. Because we may be able to provide it, if we know what it is.”

Baxter sat across the table from Lechat with the specific quality of a man who has tried something and failed and is now reassessing. He was not a stupid man. He was, in some ways, a very competent man who had spent eleven years exercising a kind of authority that the Congreve’s presence was threatening — not physically, not politically in any direct sense, but in the deeper structural sense. The fabricators worked by a principle that made his kind of authority redundant.

“I wanted access to the production records,” he said, finally.

“I know,” Lechat said.

“Because unmanaged access is a threat to community security.”

“Tell me specifically what you’re afraid of,” Lechat said.

Baxter was quiet for a long moment. “I’m afraid of what happens when people feel safe enough to stop cooperating,” he said. “When the supply is no longer constrained, the pressure to share — to act in collective rather than individual interest — goes away. We built this community on mutual obligation. People help each other because they have to. Because the alternative is that nobody survives.”

“And if they don’t have to anymore?”

“Then they stop,” Baxter said. “They look out for themselves. They stop coming to the community meetings, the shared work schedules, the allocation sessions.” He paused. “We’ve seen it already. In the three weeks since the first fabricator went in, the attendance at the

weekly allocation session is down by thirty percent. People don't feel the urgency."

"Do they still do the work?" Lechat asked.

Baxter paused. "Mostly."

"Do they help each other?"

Another pause. "Mostly."

"Then what's missing?"

"The — cohesion," Baxter said. "The sense of shared necessity that held everything together."

"You're mourning the scarcity," Lechat said, with complete gentleness.

Baxter looked at him. "I know how that sounds."

"It sounds accurate," Lechat said. "Not crazy. Accurate. You built something very real and very functional on shared necessity, and the shared necessity is being removed, and the thing you built doesn't have a foundation without it." He paused. "The question is whether the building can find a new foundation. And I think it can. But it requires a different set of reasons for cooperation than survival pressure."

"What reasons?"

"The same reasons people cooperate on Chiron," Lechat said. "Because they want to. Because cooperation produces better outcomes for them than isolation. Because the things they're interested in are easier to pursue in community than alone." He paused. "Those reasons are less urgent than survival pressure."

They're also more durable. Survival pressure disappears when the survival problem is solved. Genuine interest doesn't disappear."

Baxter was quiet for a long time. "You're describing a different society," he said.

"Yes," Lechat said. "That's the project."

Chapter 28: What Mara Said

On day sixty-two, Mara found Alex at the edge of the settlement, where the path ran along the river, and she had the notebook under her arm and the expression she used for things that required some effort to say.

"I have to tell you something," she said.

"Okay," he said.

"I've been reporting on you to the Security Council. Not just to my mother's board. Directly to Baxter's team." She said it flat and straight, the way she said things that were true and uncomfortable. "They asked me to note specific things — what you talked about when you were with the Chironian adults, whether there were differences between what your people said publicly and what you said privately, whether there were things you seemed to be concealing."

Alex looked at her. The look was attentive and not theatrical.

"I know," he said.

She stopped. "You—"

"We figured it out in the first week," he said. "Fen and Juren — the security specialists on our team — they noticed the pattern and

mentioned it to Kath. Kath mentioned it to me.”

Mara was very quiet.

“It wasn’t a problem,” Alex said. “The things we were saying privately were the same things we were saying publicly, because we don’t have different registers. And your reports were accurate, so they would have confirmed that.”

Mara was looking at him with the expression she used when a variable in her calculation had changed significantly. “You’re not—” She stopped. “You’re not angry.”

“No,” he said.

“Why not?”

“Because you were doing what you were asked to do,” Alex said. “You’re eleven and you live in a community that’s been managing crisis for your entire life and you were asked by a council member who has significant authority in your community to provide information. Saying no would have had costs for you.” He paused. “And your reports were accurate, which means the council got true information about us, which is better than if they’d had false information.”

“But you knew,” Mara said. “And you kept talking to me.”

“You were worth talking to.”

She was quiet for a long time. The river moved beside them, fast and cold from the mountain runoff. An actual bird — something large and dark — moved across the far bank in the way that things moved in recovered ecosystems: purposefully, without the furtiveness of something that expected danger.

“I stopped,” she said. “Reporting. After the boarding attempt.”

“Why?”

“Because after the boarding attempt I understood what they were going to do with the information,” she said. “They weren’t trying to understand you. They were trying to find vulnerabilities. Things they could use.” She looked at the river. “And you didn’t have any. Or I couldn’t find any. And I think—” She stopped. “I think if you had had vulnerabilities I still wouldn’t have reported them.”

“Because?”

“Because what they were trying to do was wrong,” she said. “Taking the ship by force. Controlling the fabricators.” She was still looking at the river. “I knew it was wrong before the attempt. I should have said something earlier.”

“You were calculating,” Alex said.

“Yes,” she said. “I calculate everything.”

“That’s not a flaw,” he said.

“I calculated wrong,” she said.

“You calculated with incomplete information,” Alex said. “You didn’t have access to what Baxter was actually planning. You thought — I think you thought — that the reporting was going to inform a legitimate security assessment. Not a plan to take the ship by force.”

She was quiet.

“Was I wrong?” he asked.

“Probably not,” she said. “But I should have — I should have seen it sooner.” She finally looked at him. “The thing I wrote in my notebook after the boarding attempt was—” She opened it. She read:

They tried to take the ship. The ship was unavailable. Forty-seven people couldn't get through the bay doors of a ship staffed by Chironians. Not because of weapons or force. Because the ship doesn't cooperate with things that aren't right.

She closed the notebook. "Does a ship know what's right?" she asked.

"The people who built it do," Alex said. "They designed it accordingly."

Mara thought about this for a long time. Then she said: "What's it like? Building things that work the way you want them to?"

"We build things to work the way principles work," Alex said. "Not to work the way we want. There's a difference."

She looked at him. "What's the difference?"

"What I want can be wrong," he said. "Principles that are right keep working even when I want something wrong."

She turned this over in the way she turned things over — carefully, checking it from different angles. "Then you trust the principle more than yourself," she said.

"More than my desire," he said. "Not more than my judgment. I have to judge whether the principle is the right one."

"And the ship principle was — don't cooperate with force."

"Roughly," he said.

"And it worked."

"Yes."

She was quiet again. Then: "I want to see your world," she said. "Chiron. I want to see what a place looks like where people build

things on principles instead of on—” She looked for the word.

“Fear?” Alex offered.

“Scarcity,” she said. “There’s a difference.”

He looked at her. “Maybe,” he said. “Maybe not always.”

“Maybe not always,” she agreed.

They sat by the river for a while after that, not talking much, watching the bird on the far bank go about whatever business it had, entirely unconcerned with either of them.

Chapter 29: What Kath Explained

The conversation happened on the sixty-fifth day, in the planning room at the community building, when Lechat finally asked the question he had been not asking since the boarding attempt.

“The ship,” he said. “The way it responded. The rotating bay, the navigation interference, the configuration that wasn’t in any documentation.”

“Yes,” Kath said.

“That was designed in. Before we left Chiron.”

“Yes,” Kath said.

“Without telling me.”

“Yes.” She was very calm about this. It was the specific calm of someone who has been expecting the conversation for a while and has thought through exactly what she wants to say. “The Chironian team that built the ship’s systems included a set of protocols for

exactly this kind of situation. A situation where someone with authority on Earth tries to take control of the ship.”

“Why didn’t you tell me?”

“Because if you’d known,” Kath said, “you would have had to decide whether to act on the information or conceal it from the Southern Reach, and either choice was more complicated than not knowing. You were transparent with Vasquez and Baxter about the ship’s capabilities. That transparency was genuine.”

Lechat looked at her for a moment. “You’re saying my ignorance of the protocols was a feature.”

“It was a choice,” Kath said. “Not about you specifically. About the value of genuine transparency at the cost of knowing less than we could have known.”

“That’s—” Lechat stopped. He was finding a response that was precise. “That’s very Chironian.”

“Yes,” Kath said.

“I’m not Chironian,” Lechat said.

“No,” Kath said. “But you operate by similar principles when they’re clearly the right ones. You didn’t tell Vasquez everything you knew about Chen before making contact with the Southern Reach, because the information would have shaped her response to him in ways that weren’t fair to either party.”

“That’s different.”

“The mechanism is the same,” Kath said. “Withholding information that would produce worse outcomes than not having it.”

Lechat was quiet for a long time. “The difference,” he said, eventually, “is that the information about the ship protocols affected my ability to be in genuine relationship with Baxter and the Security Council. I was in a relationship that had a false premise I didn’t know about.”

“Were you?” Kath asked. “Or were the ship’s protocols simply a fact about the ship that you didn’t know, the same way you don’t know every specification of every system on board?”

“The protocols were designed to operate without my knowledge,” Lechat said. “That’s not the same as not knowing a specification.”

“No,” Kath said. “It’s not the same.” She was quiet for a moment. “You’re right about that. It was a choice that had consequences for your relationships on Earth that weren’t fully thought through.” She paused. “I should have told you. Earlier, when the situation was becoming clear.”

Lechat looked at her. This was not the expected response. She had a way of acknowledging an error that was very specific — not apologetic in the self-flagellating sense, not defensive, but simply accurate. “Yes,” he said. “You should have.”

“I’ll remember it,” she said. Not as a promise, exactly. As a calibration.

“How much of this mission was planned before we left in ways I don’t know about?” Lechat asked.

“The general framework,” Kath said. “Not specific actions or decisions. The framework was: we go, we demonstrate, we teach, we leave the tools and some people, we come back. Within that framework, everything was decided in real time, including by you.” She paused. “The ship protocols were the one thing that was fully pre-decided, and it was pre-decided because the Chironian team

didn't want the decision about how to respond to a hostile boarding attempt to have to be made under pressure."

"And who decided the protocol?" Lechat asked.

"The ship design team," Kath said. "Which was about thirty people. And which didn't include you." A pause. "Which is the part I regret. You should have been consulted."

"Why wasn't I?"

Kath looked at him steadily. "Because you would have modified it," she said. "And the modification would have reflected your Terran instincts about command authority and response options, and the result would have been a ship that could be taken under certain conditions that the Chironian team thought were unacceptable."

Lechat sat with this for a long moment.

"I'm the mission commander," he said.

"Yes," Kath said.

"And you designed the ship so that the mission commander couldn't authorize certain actions."

"So that no one could authorize certain actions," Kath said. "Not just you. Anyone. The ship doesn't cooperate with force, regardless of who requests it."

"And that's a principle," Lechat said.

"Yes."

"And you trusted the principle more than you trusted me."

"We trusted the principle more than we trusted the situation," Kath said. "The situation was going to produce pressure. Principles are

designed for pressure.”

Lechat was very quiet.

“What do you want me to say to this?” he asked.

“I want you to understand it,” Kath said. “I’m not asking you to approve of it. I’m telling you what was done and why. And I’m telling you that I should have told you earlier, and that’s a genuine error.”

“And the principle itself?”

“The principle,” Kath said, “is that we are not here to be taken. We’re here to offer. And an offer made under compulsion is not an offer.”

Lechat was quiet for a long time. Then: “How does this relate to Chen?”

“Chen built his authority on necessity,” Kath said. “His necessity was real. But the structure it produced is a structure that was built for a specific condition that no longer fully exists. The fabricators change the supply condition. The archive release changes the information condition. What remains is the authority structure, which was necessary and is now — less necessary than it was.” She paused. “He knows this. That was what the meeting with you was about, underneath everything else.”

“He’s trying to understand if he can voluntarily dismantle it,” Lechat said.

“He’s trying to understand if he can trust a process enough to step back from it,” Kath said. “Which is the same thing Chen asked of himself in year one, from the other direction. In year one he needed to trust himself enough to step forward. Now he needs to trust the process enough to step back.”

“And can he?”

“I don’t know,” Kath said. “But I think Linh might help with that.”

Chapter 30: What Kath and Chen Said

The meeting between Kath and Chen was not on any official schedule.

It was arranged through Linh, who sent a message to Kath through the secure channel that said: *He’d like to talk to you. Specifically you. I told him I’d ask.*

Kath’s response: *Tomorrow morning. His facility.*

The meeting was three hours, which neither of them had planned but which turned out to be the right duration.

Colman learned what was said afterward. Kath was more complete in her accounts of things than most people, and she offered the account voluntarily, which meant she had decided it was important for him to know.

They had started, she said, with technical questions. Chen had genuine curiosity about the Chironian manufacturing base — not strategic curiosity, but the specific curiosity of an engineer about how things worked. He knew the Chironian fabricators were based on molecular assembly principles; he wanted to understand the feedstock conversion efficiency and the energy requirements at scale, and he had questions that were precise and well-informed.

Kath had answered them completely. This had surprised him.

“Why does it surprise you?” she’d asked.

“Because you’re providing detailed technical specifications for your core infrastructure to someone who has been classified as a potential risk,” he’d said.

“Are you a risk?”

He'd thought about it. “Not to you,” he'd said. “Not to the mission. To the concept — possibly. My system is the antithesis of your model.”

“Your system kept six hundred thousand people alive,” Kath had said.

“Yes. And has made them structurally dependent on centralized allocation in ways that your model would consider harmful.”

“I would consider it a historical consequence rather than a harm,” Kath had said. “The harm was the war. The centralization was an adaptive response to the harm. The question now is whether the adaptive response is still adaptive.”

“And your conclusion?”

“My conclusion is that you're the best person to answer that question and that you're asking it honestly,” Kath had said. “Which makes you significantly different from people whose structures are no longer adaptive but who are pretending they still are.”

Chen had been quiet for a long time at that point.

Then he had asked: “Why did you come to see me specifically? Not Lechat, not Colman?”

“Because you needed someone who understands what you built and why,” Kath had said. “Lechat understands the political dimension. Colman understands the operational dimension. But the thing you built — the specific texture of it, the principles you operated from, the decisions you made in year one — that required someone who has thought about the same questions from a different angle.”

“And you've thought about them.”

“I grew up in a civilization that reached similar conclusions from a different starting point,” Kath said. “On Chiron, the conclusion that coercion doesn’t work came from never having needed it. On Earth — in the Mountain State — the conclusion might come from having used it and understood exactly what it was and why it was necessary and why it stops being necessary when the conditions change.” She paused. “That’s actually a more complete understanding than ours. You know what it costs.”

“I know exactly what it costs,” Chen had said.

They had moved, after that, into a different kind of conversation — not about policy or strategy or the technical details of the fabricators, but about the specific question of what it felt like to be responsible for a large number of people for a long time. Kath had not been responsible in Chen’s way — no Chironian had — but she had been part of the planning structure for the mission, which was the closest thing Chiron had to the kind of authority Chen exercised.

“The difference,” Kath had said, “is that I was always aware that my authority was contingent on people choosing to work with me. The moment I was no longer useful to the planning, I would no longer have been part of it. Not removed, not punished — simply less relevant.”

“And that never bothered you?”

“It seemed correct,” she had said.

“And my authority,” Chen had said, “has not been contingent in that way. I have authority because I am necessary and because the alternatives to my authority were clearly worse. But not because people are choosing.”

“Do they know they could choose?”

He had been very quiet at that point.

“Some of them,” he had said.

“And the others?”

“Don’t know what the alternatives are,” he had said. “Because they’ve never had any.”

Kath had let that sit for a long time before responding. “The fabricators will give them the beginning of an alternative,” she had said. “Not immediately. Not in a way that replaces everything you’ve built. But the first time someone produces something for themselves, from the fabricator, without asking your allocation system — that’s the beginning of knowing there’s another possibility.”

Chen had been quiet for a long time. Then he had said: “The archive.”

“Yes?”

“I’ll give it to you unconditionally. No terms.” He had said it without drama. “The proposal I made to Lechat — the base of operations exchange — I’m withdrawing it. You don’t need a base of operations and the exchange would have been wrong.”

“Why?” she had asked.

“Because it would have made the archive’s value contingent on our relationship,” he had said. “And the archive belongs to everyone who can use it. That includes your people.” He had paused. “You said you came because you might have lost things we preserved. That’s true. You should have the archive unconditionally because it’s yours as much as mine.”

Kath had looked at him. “Thank you,” she had said.

“Don’t thank me,” he had said. “I’m doing it because it’s correct.” A pause. “Not because I’m generous. Because it’s correct.”

“Those are the same thing,” Kath had said.

He had looked at her with the expression that meant he was parsing a statement carefully. Then: “Perhaps they are.”

The last thing he had said, as she was leaving, was: “Linh. She’s going to tell me things I don’t want to hear.”

“Yes,” Kath had said.

“Good,” he had said. “I need that.”

Chapter 31: Seeds

The third month of the Earth visit was different from the first two.

The medical emergency had been addressed — not completely, not finally, but substantially. The pharmaceutical deficit in the Southern Reach was no longer a daily crisis; it was a managed situation trending toward sufficiency. The initial shock of the Congreve’s arrival had settled into something more like ongoing reality, which meant that the psychological space that had been occupied by the crisis was beginning to clear.

What occupied it next was, Colman noted, surprising.

People started talking to each other differently.

Not the Congreve’s people talking to Earth’s people. Earth’s people talking to each other.

The first sign was at the Southern Reach’s weekly community meeting, where the attendance figures that Mara had been recording showed a reversal: down thirty percent from pre-Congreve levels three weeks after the fabricators went in, then gradually climbing, and by week seven back to normal, and by week ten above it.

“What’s drawing them back?” Colman asked Mara.

She had her notebook, of course. “Different conversations,” she said. “Before, the meetings were about allocation — who gets what, how much, which district’s claim takes priority. People came because they needed to be there to protect their interests.”

“And now?”

“Now the allocation questions are less urgent. So the meetings are about other things.” She turned a page. “In the last three meetings, the main topics were: how to set up a second fabricator unit in the northern district, whether to expand the inter-community exchange program with the Vale Federation, and a proposal for a shared children’s education curriculum with Wellington.”

“Those are planning conversations,” Colman said.

“Yes,” Mara said. “Not survival conversations. Planning conversations. People are coming because they want to shape what’s being built.”

She said it as observation. Colman heard it as something more.

The Southern Reach and Vale Federation exchange program, which had been formalized in the forty-third day of the Earth visit in a meeting between Vasquez and Professor Schafer via the communication link the Congreve had established, produced its first visible result in the seventy-first day: a group of twelve Southern Reach engineering students arrived in Innsbruck for a six-month program. They came by the Congreve’s shuttle, which made the Vale Federation accessible for the first time in years, and they brought with them a cargo of Southern Reach agricultural seed stock that the Vale Federation’s botanist had been requesting for three years.

“They arranged it themselves,” Lechat noted. “Between our first contact and now.”

“Forty-one days,” Kath said. She was looking at the manifest of the shuttle’s cargo. “Forty-one days from first contact to autonomous community exchange, without us as intermediary.”

“We provided the shuttle,” Colman said.

“We provided transport,” Kath said. “They provided the agreement and the goods and the people.” She set down the manifest. “That’s the distinction that matters.”

The first fabricator unit not installed by the Congreve’s team was installed on day seventy-nine, by Southern Reach technicians, in the Wellington district’s medical center. It used a unit that had been transferred from the Congreve’s cargo as a kit — a flat-pack assembly that came with a setup manual and a thirty-minute video orientation — and the installation was completed in six hours by two engineers who had been trained on the Nelson unit for three weeks.

It worked.

The Wellington district medical director, who had been present for the installation and who had the specific expression of someone who has spent years being careful about hope, sent a formal communication to Vasquez that evening: *Unit operational. First production run completed. We ran a full specification test on the antibiotics output. Grade matches the Nelson unit standard. We did this ourselves.*

Vasquez forwarded the message to Lechat with a single added line: *We did this ourselves.*

Lechat showed it to Colman. “That’s the line,” Colman said.

“Yes,” Lechat said.

“‘We did this ourselves.’ Not ‘you gave us this.’ Not ‘the ship made this possible.’”

“We made it possible,” Lechat said. “But that’s not how they experienced it. They experienced it as something they built.”

“Which they did,” Colman said.

“Which they did,” Lechat agreed.

On day eighty-three, Chen Yi-jun did something he had not done in eleven years.

He called an open community meeting.

Linh told Colman about it in a message from Fort Collins: *He announced it three days in advance. All Mountain State community members invited. Agenda: the future of the resource allocation system. It drew four hundred and twelve people to the Fort Collins facility. Standing room.*

At the meeting, Chen had explained the changes in the supply situation — the fabricators, the pharmaceutical sufficiency, the exchange program with the other communities. He had explained the archive release and what it would mean for access to pre-war technical knowledge. He had explained, with the specific precision he brought to everything, that the material conditions that had justified the triage-based allocation system of the past eleven years were changing.

And then he had said: *I want to hear from you what the allocation system should look like going forward. I’m not deciding this in this room. But I’m starting the conversation here.*

Linh's message ended: *It's not a revolution. It might be the first step toward one. He knows it. He said to me afterward: 'I've been managing decisions for eleven years. I may have forgotten how to share them.' I told him that's what I was here for. He said: 'I know.'*

Colman read the message twice. Then he showed it to Kath.

She read it once. Then she looked at the window — the New Zealand morning sky, blue-white and clear. Then she said: “Good.”

Just that. “Good.”

It was, Colman thought, exactly the right amount to say.

Chapter 32: Departure

They left on day ninety-four, which was slightly longer than the planned sixty-day surface phase, which was slightly shorter than Colman had begun to think might actually be needed, which was probably correct.

The departure logistics were complicated and Bernard managed them with the specific kind of authority he exercised when something had to be done correctly and quickly: quietly, precisely, and with the expectation that people would keep up.

Six people were staying. Their names were Fen, Juren, Ora (the pilot, who had been training Southern Reach pilots on the shuttles and had decided the training wasn't finished), Tara (the physician, who had a full clinic running and was, in Bernard's assessment, not leaving because the clinic was more interesting than the ship), a Chironian engineer named Soru who had been working with the Mountain State technical team and who Linh had specifically requested as a colleague, and a historian named Priya who had found the Vale Federation's preserved institutional records more fascinating than

anything she'd anticipated and had gotten permission from Professor Schafer to work in the archives for two years.

Bernard had arranged a pickup schedule: the Congreve would return in twenty-six months for the six volunteers and any others who wanted passage. The schedule had been communicated to all three major communities with the precision of someone who understood that a deadline makes things real.

Linh was staying. This was her decision, confirmed to Colman three days before departure in a brief conversation in the engineering bay.

"You've thought about it enough?" Colman asked.

"Yes," she said.

"Is there anything—"

"I know what I'm doing," she said. Not dismissively. With the calm of someone who has completed a process and arrived at a place. "Chen is not going to transform overnight. He might not transform at all. But the work here is real and I'm interested in it and I'm the right person to do it." She paused. "The question I came with — whether the people who destroyed Earth were 'my people' — I've answered it, I think."

"What's the answer?"

"They were people who made specific choices in specific circumstances," she said. "My grandfather made similar choices. So did I, by different means, in different circumstances. The question of whose people they are is less useful than the question of what choices I make." A pause. "Chen made terrible choices and correct ones, sometimes at the same time. I want to understand how someone does that and what it means for what comes after." She looked at Colman. "That's my work. For two years."

“And after two years?”

“We see,” she said.

The farewell between Chen and the Congreve team happened at the Fort Collins facility, on a clear morning with the Rocky Mountains visible to the west in the kind of detail that requires specific atmospheric conditions.

Chen stood at the landing area and watched the shuttle load. He had done the characteristic thing: come early, positioned well, with no visible signs of the significance of the moment.

When Lechat came to him, they shook hands — it had taken three months, Colman reflected, for that gesture to feel natural between them.

“You know that she’s going to tell you things you don’t want to hear,” Lechat said.

“I know,” Chen said. “I said that to Kath.” He paused. “She told me that was the point.”

“It was,” Lechat said.

“The archive transfer is complete,” Chen said. “Linh verified the final index files this morning. Every file, fully intact, fully annotated. Your people can start with the materials science library — it’s the most relevant to Chironian manufacturing development.” A pause. “The physics library is interesting. Some of the pre-war theoretical work on antimatter confinement may be useful. My analysts have tagged specific files.”

“Thank you,” Lechat said.

“The exchange is genuine,” Chen said. “I’d like to think of it as the beginning of something rather than the conclusion of something.”

“I hope it is,” Lechat said.

They stood for a moment in the way that farewells work when neither party is inclined toward performances of feeling — a moment that was complete without being dramatized.

Then Lechat went to the shuttle.

Chen watched it go. He stood at the landing area in the cool mountain morning, alone except for the two aides who maintained a respectful distance, watching the shuttle become a shape and then a point and then nothing.

He turned and walked back into the facility.

The meeting, Linh told Colman later, had resumed within the hour. Chen had a proposal from three of the Fort Collins community members for a revised food allocation structure. He’d called them in and listened. He’d asked fourteen questions. He’d told them he’d have a response in a week.

It was not a revolution. It was not a transformation.

It was a meeting where Chen Yi-jun asked fourteen questions and didn’t give the answer yet.

For a man who had been giving the answers for eleven years without being asked for them, it was something.

The Southern Reach departure was different.

Vasquez was there, with the council, with a larger crowd of community members who had assembled at the landing area in

Nelson with the specific quality of a crowd that has come because they want to be present at something, not because they're required to be.

The mood was complicated and specific and real. There was relief — the pharmaceutical situation was addressed, the fabricators were working, the supply nightmare that had been the constant background of Southern Reach life had receded to a manageable concern. There was gratitude, which had the complicated quality of gratitude offered by people who had been hoping for exactly this and had not quite believed it would arrive.

And there was fear.

The fear was visible in the way Vasquez held herself — the controlled quality of someone who is managing something carefully. The Congreve was leaving. The six volunteers were staying, but the ship was leaving. And the ship was the thing, more than any specific resource, that had represented the difference between what the Southern Reach had and what was possible.

“You’ll come back in twenty-six months,” she said, to Colman, at the loading bay.

“Twenty-six months,” he confirmed.

“And if something goes wrong—”

“There’s a distress channel,” he said. “We’ll monitor it continuously. Response time for anything urgent is approximately twelve months.” He paused. “And Fen and Juren and Tara and Ora are staying. They’re not here because we left them. They’re here because they chose to be.”

“I know,” Vasquez said. “I know all of that.” She was looking at the shuttle with an expression that was hard to read precisely. “I keep thinking about the water allocation,” she said. “In Nelson. The

number that matters to me every day. Before your ship arrived, that number was the edge of everything — there was a level below which the allocation couldn't go without serious consequences, and we were close to it.”

“And now?”

“Now the fabricators can supplement the supply in acute shortages,” she said. “So the edge isn't the same edge. It's farther away.” She paused. “That's not a small thing. It feels like— it feels like room. Like there's room now that there wasn't.”

“There is room,” Colman said.

“I'm trying not to become dependent on room,” she said. “The room you gave us is real. I don't want to build the next eleven years on the assumption that you'll always be there to provide it.”

This was, Colman thought, one of the wisest things anyone had said to him on this planet.

“That's exactly right,” he said.

“The fabricators teach as much as they produce,” Vasquez said. She was looking at him now, directly. “I understand that principle. I think I understood it before you arrived, in the abstract. Now I understand it because I've watched it.” She paused. “My question is how long the teaching takes.”

“I don't know,” Colman said.

“But you think it works.”

“I think the process works,” Colman said. “I've seen it work on a longer timeline, in a specific context that had advantages yours doesn't. I think the core of it — that people given abundance will eventually learn to live in abundance rather than in the fear of

scarcity — is correct. The timeline is the part I genuinely can't predict."

"Honest answer," she said.

"It's the only kind I have."

She looked at him for a moment. Then she extended her hand.

"Come back," she said.

"Twenty-six months," he said.

Chapter 33: What Alex Gave Mara

On the last day, in the morning before the final shuttle departure, Alex went to find Mara.

She was at the river path, which was where she went when she was thinking — he'd learned this in three months. She had her notebook but it was closed. She was watching the current in the way that people watch things that are always moving and that reflect the light differently at different moments.

She was thirteen. In three months she had grown into herself slightly further than she'd been when they arrived — not taller, not obviously changed, but with a quality of certainty that had not been there in the same proportion. As if the things she'd seen and talked about and thought through had settled something that had been unsettled.

"I have something for you," Alex said.

She looked at the thing in his hand.

It was small — about the size of a thick book, with a clean matte surface and a control interface on one side that was Chironian in its design: simple, direct, self-explanatory.

“What is it?” she asked.

“It’s a personal fabricator,” he said. “Very small scale. It produces objects up to about thirty centimeters in any dimension, from any material composition you can describe. The power source is a thermal gradient element — it pulls energy from the temperature differential between your body heat and ambient air. It charges itself while you carry it.”

She looked at it. “It produces things forever?”

“Until the structural components wear out,” he said. “Which is estimated at about fifty years. Or until you lose it.”

She looked at him. “This is Chironian technology.”

“Yes.”

“You’re giving this to me personally.”

“Yes.”

She looked at the fabricator again. It had the specific quality of something well-made — not beautiful in an ornamental way, but beautiful in the way of things whose design is an accurate expression of their function.

“Why?” she said.

“Because you’re going to need tools,” he said. “Not necessarily this tool. But the habit of having the right tool. And right now the right tool is one that doesn’t depend on the allocation system.” He paused. “Your notebooks are your tool for recording. This is a tool for making.”

“I’m thirteen,” she said.

“I know.”

“What am I supposed to make with it?”

“Whatever you need,” he said. “And then whatever you decide is worth making, after the needs are covered.”

She took it from him. It was lighter than she’d expected, he could tell from the slight adjustment she made when she received its weight. She turned it in her hands.

“I have something for you too,” she said.

She reached into her pocket and produced a stone. It was flat, smooth, the blue-grey of the New Zealand coast stone that had been in rivers and on beaches long enough to have all its edges worn off. It was unremarkable except that it was a perfect example of its type — smooth all the way around, with a weight and density that felt exactly right in the hand.

“From the beach,” she said. “The first day you came. I picked it up when you weren’t looking.”

“You had it since the first day?”

“I thought you might need something from Earth,” she said. “I thought — if you’re leaving and you’re going back to a place where you’ve never been short of anything, you might want something to remember what shortage felt like.” She paused. “But that’s not quite right. It’s not about shortage. It’s about—” She looked for the word. “It’s about weight. Things that have weight.” She held the stone. “Chiron doesn’t have stones like this. They take a long time. They need rivers and beaches and millions of years.”

He took it. He held it. She was right — it had weight, the specific weight of something that had been shaped by long duration rather than by design.

“I’m going to bring this back when I come back,” he said.

“You’re coming back?”

“Someone will,” he said. It was a phrase he’d heard his mother use, and it fit this moment in a way he understood without being able to fully explain. “Me or someone else. The people who stayed are going to be here for two more years and someone has to come back for them.”

“And in two years I’ll be fifteen,” she said.

“And I’ll be thirteen,” he said.

“You’ll still be behind,” she said, with the ghost of a smile that was one of the rarest things on earth in the original sense of that phrase.

“I’ll catch up,” he said.

They stood at the river for a while without talking, the way they’d learned to be together in three months — comfortably, without needing the conversation to justify the company. The river moved. The bird that had been on the far bank was there again, or one like it. The morning was clear.

“The notebook,” Alex said eventually.

“What about it?”

“Keep doing it. The numbers. The observations.” He paused. “But add one thing.”

“What?”

“Write down what you want,” he said. “Not what you have or what the supply numbers are. What you want.”

She looked at him. “Why?”

“Because the numbers-based notebooks are about what is,” he said. “And you’ve been so good at that — so precise and accurate about what is — that I want to make sure you have space for what could be.” He paused. “The fabricator is a tool for making things. But you have to know what you want before you can make it.”

She considered this for a long time. “What do you want?” she asked. “When you get home.”

“To understand what I saw here,” he said. “To figure out what it means that the best person I met on Earth has been keeping a supply notebook since she was seven and that the notebook is more accurate than the council records.” He paused. “I want to figure out what it means that it had to be a kid doing it, because the adults were writing what they wanted to be true instead of what was true.”

“And what does it mean?”

“I don’t know yet,” he said.

She nodded. She looked at the fabricator in her hands. “Thank you,” she said.

“Thank you,” he said.

“For what?”

“For showing me the settlement,” he said. “For the notebook. For being honest about what you were doing, even when it cost you something.” He paused. “For being specific. For being the person who knows the water allocation and the antibiotics count and the grain harvest dates and who also sat on the beach and picked up a stone.”

She looked at him. The look was the direct one, the evaluating one, the one that had been there the first day. But it had something

different in it now — not softer, exactly, but more complete. As if the evaluation had reached a conclusion.

“Come back in two years,” she said.

“I’ll try,” he said. “I’ll come back for Fen and Juren and Tara and Ora and Soru and Priya. And I’ll come find you.”

“All right,” she said.

She put the fabricator in her pocket, where it fit — she had calculated this, of course. She gave him the stone. She looked at the river.

“Go,” she said. “You’ll miss the shuttle.”

He went.

She watched the shuttle from the river path. He knew she would be doing this, and as the shuttle lifted he pressed his hand against the window — a small window, not obviously visible from the ground — in the direction of the river, in case it was visible and in case she was looking.

He didn’t know if she saw it. He thought maybe she did.

The Nelson landing area was already cleared by the time the shuttle lifted for the last time. Vasquez was gone. Baxter was gone. The community members who had assembled in the morning had dispersed into their days, which had the specific shape of the lives of people who have real things to do and who are doing them.

Tara was at the clinic. Fen and Juren were at the Security Council facility, which Baxter had invited them into — with some visible effort — for a briefing on the settlement’s security protocols. Ora had three students in the air over the South Island in one of the Southern

Reach's atmospheric flyers. Priya was already on a transit vehicle to the Alps.

Soru was in Colorado, with Linh, working on the feedstock conversion specifications for the Mountain State's fabrication unit.

The six of them spread across three communities on a planet, settling into work. Settling into place.

The shuttle cleared atmosphere and docked with the Congreve, and the Congreve began to move — slowly at first, the orbital burn that began the long departure trajectory, the burn that pointed them toward Alpha Centauri and the journey home.

EPILOGUE: STARS

One year out from Earth.

The Congreve was in deep space again, in the specific peace of the transit that its passengers had learned over the years to inhabit. The common areas were lit with the comfortable warmth of early evening. The atrium plants had grown noticeably since departure — one of the tomato varieties had needed staking, which Fen's daughter Miri, who had joined the voyage at age nine months, had watched with the concentrated attention of someone witnessing a natural process for the first time.

The children were different.

Tomas was different most visibly — he'd been on Earth for three months, had seen where his parents were from, had walked through the processing center with the mold history and the managed secrets, had met three of his extended family members who had survived in the Melbourne community, had said goodbye to them knowing the goodbye was real. He was quieter now, with the specific quality of

someone who has absorbed something and is still working through its implications.

Saan was different in a subtler way. She had spent three months on a planet that was explicitly not the one she'd come from, in communities organized by scarcity and hierarchies she didn't share, talking to people who had survived things she hadn't, and she had done this with the Chironian openness of a person who knows that being unsettled is not the same as being in danger. She had come back with three notebooks — Mara's influence, which Colman had noted with something he was going to have to find a more specific name for than pride.

Alex was different in a way that was difficult to articulate, which was probably the right word for it. He had arrived at Earth as a ten-year-old who had grown up in deep space among adults working through large questions. He was leaving as an eleven-year-old who had touched the ground of the planet that was in him, genetically, through his father, through the specific inheritance of a civilization he had never lived in, and who had found it exactly as complicated as anyone who knew anything would have predicted.

He had the stone in his pocket.

He had carried it continuously since Mara had given it to him — not as a talisman, not for any superstitious reason, but because it was real in a way that he found useful to be reminded of. It had weight. It had history. It had been shaped by processes that had nothing to do with him, over timescales he couldn't experience, and it sat in his hand as itself, neither more nor less than what it was.

He was on the observation deck one year out, alone, watching the stars.

Colman came in at the forty-minute mark of Alex's solitude, which was not quite deliberate and not quite accidental — he had learned

over ten years to be where he was needed without quite knowing how he knew when he was needed there. He brought two cups of tea. He sat beside Alex on the observation bench without saying anything.

The star field was what it always was: comprehensive, indifferent, precise. Sol was behind them, still distinguishable by position but visually identical to everything else in the field. Alpha Centauri was ahead, brightening year by year.

After five minutes, Alex said: “I keep thinking about Mara.”

“Yes,” Colman said.

“Not because I miss her, exactly. More because—” He held the stone, turning it in his hands. “More because she’s the specific person I know on Earth, and Earth is the specific place I know because I know her. If I think about Earth, I think about the supply numbers and the clinic and the river path and the stone.”

“That’s how knowing places works,” Colman said.

“The files were the abstract,” Alex said. “Mara is the specific. The specific is realer.”

“Yes.”

“She’s going to be fine,” Alex said. He said it not as reassurance — not for Colman’s benefit or his own — but as an assessment. The way he’d say that the ship’s secondary drive system was within tolerance. He had looked at the evidence and reached a conclusion. “She’s smart and she pays attention and she’s not afraid of being uncomfortable when being uncomfortable is what’s required. And she has the fabricator.”

“She has the fabricator,” Colman agreed.

“And the notebook.”

“And the notebook.”

Alex was quiet for a while. Then: “Do you think Chen is going to change?”

This was the question Colman had been sitting with for a year and had not answered to his own satisfaction. “I think he’s going to think about it for a long time,” he said. “And then I think he’s going to do something that surprises Linh.”

“Good surprise or bad surprise?”

“I think probably something that’s both,” Colman said. “At the same time.”

Alex nodded slowly. This seemed to satisfy him in the way that honest uncertain answers satisfied him. “The Southern Reach is going to be okay,” he said. “Vasquez knows what she’s doing.”

“She does.”

“The Vale Federation has Professor Schafer.”

“Yes.”

“And the scattered communities?” Alex said. “The small ones. The faint points on the map.”

“That’s the part I don’t know,” Colman said. “The six volunteers have access to some of them. The Southern Reach is expanding its contact network. But most of them—” He paused. “We don’t know.”

“Are they okay?”

“Some of them,” Colman said. “Some of them probably aren’t. We don’t know which ones and there wasn’t enough time to find all of them and there weren’t enough of us to help if we’d found them.” He paused. “That’s the part that—” He stopped.

“That stays with you,” Alex said.

“Yes.”

Alex looked at the star field. “The fabricators will spread,” he said. “The Southern Reach has the knowledge now. They can build more and they can share them. The Vale Federation has the technical curriculum. In twenty years—”

“In twenty years things will be different,” Colman said. “Whether they’ll be better depends on choices people make that we can’t make for them.”

“But the seeds are in,” Alex said. He said it with the specific certainty of someone stating a mechanical fact, not a hope. “Mara has the fabricator. She knows how to use it. She’ll teach someone else. Who’ll teach someone else.”

“Yes,” Colman said.

“And the archive is public,” Alex said. “And the exchange program between the Southern Reach and the Vale Federation is running. And Chen called an open community meeting.” He paused. “The seeds are in.”

Colman looked at him. His son: a person who had grown up with the full resources of a post-scarcity civilization, who had spent three months on a broken planet, who was holding a river stone from New Zealand, who was looking at the stars with the specific quality of someone who has found something worth understanding in the universe.

“Yes,” Colman said. “The seeds are in.”

Alex turned the stone over. It caught the light from the observation deck’s illumination and showed its blue-grey surface, unremarkable and very specific.

“She’s going to want to come,” Alex said. “To Chiron. Someday. When she’s old enough to decide.”

“Maybe,” Colman said.

“She’s going to want to see what we see from here,” Alex said. “The clean version. The version where the problem is already solved and the question is what to do with the freedom.” He paused. “She’s going to find it very strange.”

“It is very strange,” Colman said.

“And very good,” Alex said.

“And very good,” Colman agreed.

Kath arrived a few minutes later, in the way Kath arrived places — without announcement, without transition, simply there, with tea of her own and the specific Chironian calm that Colman had spent eleven years learning to read, and which he could now read with reasonable accuracy.

She sat on Alex’s other side. The three of them looked at the star field, which looked back in the comprehensive way of the universe.

“What are we talking about?” Kath asked.

“Seeds,” Alex said.

She was quiet for a moment. “Good topic,” she said.

“I said the seeds are in,” Alex said.

“They are.”

“And they’ll grow whether or not we’re there to watch.”

“Yes,” she said.

“But someone will go back,” Alex said. It was not quite a question.

Kath looked at the stars. She had the expression she wore when she was telling the truth about something she had thought through carefully. “In two years,” she said, “someone will go back for the six volunteers. Probably several of us.”

“And in five years,” Alex said, “or ten years, someone will go back more formally. More people. Longer stay.”

“Yes,” Kath said. “In five years, or ten, or whenever the time is right.”

“Will it be us?”

Kath looked at him. She was looking at him with the specific maternal look that was not sentiment but rather the look of someone who is seeing a person clearly, completely, as they are, and finding them more than sufficient.

“Someone will,” she said.

Colman heard the words and understood them. Someone will — not a deflection, not an evasion, but the precise answer to the question. Whether it would be Colman specifically, or Kath, or Lechat, or Bernard, or any of them — that was not the relevant question. The relevant question was whether it would happen, and it would happen, because the seed had been planted and seeds grow toward light regardless of who planted them.

He looked at his son. Alex was twelve now — nearly twelve, the birthday two months off. He would be thirteen when they arrived at Chiron, which would make him slightly older than Jay Fallows had been when the Mayflower II first arrived. He would grow up the rest of the way on Chiron, in its particular peace and abundance, with the river stone in his pocket and the supply numbers in his head and the

specific knowledge of a person who has seen both: what it's like to have enough, and what it's like to not, and the precise gulf between them that all the philosophy in the universe cannot describe as well as a single three-month visit to a broken planet that is trying to remember how to be whole.

He would do something with that knowledge. Colman was certain of this without being able to specify what. He was certain in the way of a father who sees his child's capacities more clearly than the child does, which is one of the specific gifts and burdens of the relationship.

“Do you want more tea?” Kath asked, to both of them.

“Yes,” Alex said.

“Yes,” Colman said.

She went to get it. Alex watched the stars. Colman watched Alex.

The Congreve moved through the deep between two suns, carrying its three hundred and forty-five people — six lighter than departure, six having stayed behind to do the work that stays — at the precise speed that the antimatter drive could manage, which was fast enough to cross the void in years rather than centuries, which was fast enough to make the trip possible, which was all that had ever been required.

Fast enough to go. Fast enough to return. Fast enough for the seeds to take root before you came back to see if they had.

Alex put the river stone in his pocket, where it settled into its familiar weight.

He looked at Alpha Centauri getting incrementally brighter.

He thought about Mara at the river, watching the current in the morning light, notebook in her lap, fabricator in her pocket, figuring out what she wanted to make.

He thought: good.

He thought: she's going to be fine.

He thought: I know what I need to understand when I get home.

The stars were there. They always were.

THE END

A Note on What Was Left Behind

The six who stayed:

Tara ran the Nelson clinic for twenty-three months, training four Southern Reach physicians in advanced diagnostics, before returning to the Congreve on the pickup voyage. She went back to Earth once more, two years after that, at her own request, for an eighteen-month research project on post-crisis epidemiology that produced the foundational study of recovery-phase medicine in post-catastrophic environments. She published it under her Chironian name and the Southern Reach's shared medical journal, which by then was sending copies to seventeen communities on four continents.

Fen and Juren spent their twenty-six months in Nelson building the Southern Reach's security transition from a centralized intelligence model to something closer to community self-governance. They worked with Baxter — who was, it turned out, more flexible than his first instincts suggested, once he understood that the fabricators' open access hadn't produced the instability he'd

feared. The final report they delivered to the Central Council on the day before their pickup was fourteen pages long and included eleven specific structural changes and the recommendation that the Security Council be reconstituted with elected membership and a four-year term limit. The Council voted on it two months later. Nine in favor, two against. One of the dissenting votes was Baxter's, which he cast by the established rules of a democratic process he himself had helped rebuild, which was not nothing.

Ora trained nine Southern Reach pilots to full certification on shuttle-class vehicles before returning. Three of them went on to train others. The Southern Reach had a functioning inter-community air transport network within three years that operated entirely without Chironian involvement.

Soru stayed in Colorado with Linh, working on the Mountain State's fabrication program until the pickup. He came back to Chiron with fourteen technical papers co-authored with Mountain State engineers — a specific engineering vocabulary for the operation of Chironian fabrication technology in resource-constrained environments. The papers went into the Chironian technical library and were accessed, over the following decade, by three separate research groups working on problems that had nothing to do with Earth.

Priya stayed in Innsbruck for twenty-six months and produced the first comprehensive catalog of the Vale Federation's historical archives. She found, in the collection, a nearly complete set of records from a pre-war digital humanities project that had been preserving endangered languages and oral traditions from around the world. Many of those languages had no other surviving speakers. Priya brought the archive back to Chiron, where it became the foundation of a new linguistics program at the university. Several of the languages in the archive subsequently found speakers in small surviving communities on Earth that the early Congreve surveys hadn't reached.

Linh stayed longer.

She was not on the pickup shuttle. She had sent a message six months before the pickup that said, simply: *I have more to do here. Come back in another year.* This was followed by a message from Chen: *She's right. She has more to do here. So do I.*

They came back for her a year later, as requested. By then the Mountain State had held three open community meetings and had a formal proposal on the table — approved by Chen, initiated by the community — for a revised governance structure that included an elected advisory council. The proposal was not yet adopted. It was being discussed. The discussion was real.

Linh returned to Chiron for the first time since departure. She stayed for four months. Then she went back.

She spent five years in the Mountain State before she stopped going back regularly, by which point the Mountain State's governance had changed in ways that were neither as complete as Chironian principles would have preferred nor as incomplete as Chen's early instincts would have produced. It had become something specific to its own history and its own people, which was, Kath said, the only kind of change that lasts.

Chen Yi-jun was sixty-eight when Linh first left. He was seventy-three when the governance changes took hold. He was still, by any definition, in authority — but the authority was slower, more questioned, more shared than it had been. He had learned, Linh said, to sit with the discomfort of not knowing. Which was harder for him than it would have been for almost anyone else, because his capacity for knowing had always been exceptional.

He found it, in the end, more interesting than the knowing.

Mara Petrov was seventeen when the Congreve came back for the six volunteers. She was at the landing area. She had the notebook — a

new one, the twenty-second — and she had the fabricator in her pocket, and she had the specific quality of a person who has been doing exactly what she meant to be doing for the intervening time. She had, in those four years: expanded the fabricator's application to twelve new medical compound types, trained twenty-three Nelson community members in its operation, written a technical manual for open-access fabrication that the Southern Reach's new community technology program had adopted as its primary curriculum, and begun the process of applying to the Vale Federation's university for a two-year program in materials science.

She was not on the shuttle.

She would come to Chiron later, in her own time, when she was ready. This was what she'd said, to Alex, through the message relay that the Congreve maintained.

In my own time, she wrote. When I've finished what I started here.

He wrote back: *I'll be here.*

She wrote: *I know. That's the point.*

And the stone.

Alex kept the river stone until he was twenty-two, by which point he had been on the second formal Earth contact mission, had spent eight months in the Southern Reach working on the third-generation fabrication program, had visited the Mountain State and had a long conversation with Chen that Chen later described — to Linh, who told Colman — as the most interesting conversation he'd had in three years.

When Alex was twenty-two, he was in the Franklin university and a student in his seminar — a girl from the latest wave of Earth-born students who had come to Chiron, the daughter of a Wellington

community engineer who had moved to Chiron permanently — asked him where he'd gotten the river stone on his desk.

He picked it up and held it in his palm.

“Earth,” he said. “A friend gave it to me.”

“What kind of friend?”

He thought about it. “The kind who showed me what it looks like to pay close attention to the truth even when the truth is uncomfortable,” he said. “And who then wrote down what she saw.”

The student looked at the stone.

“Can I hold it?” she asked.

He handed it to her. She held it with the appropriate weight.

“It's very smooth,” she said.

“Rivers,” he said. “And time.”

“It must have taken—”

“A very long time,” he said. “That's the thing about Earth stones. They know how to wait.”

She handed it back. He set it on the desk.

The seminar continued.

“I merely planted a seed. The wind did the rest.” — Chironian saying, first attributed to the Franklin Founders, date uncertain

FINIS

ADDITIONAL SCENES: THE DEEP VOYAGE

[These scenes expand the in-transit narrative of Parts One and Two, filling in the full texture of the six-year voyage.]

Year Two: The Long Argument

There is a specific quality to arguments that last longer than the people having them intended.

The argument that began in the ship's common area on Level Two in the fourth month of year two and that — by general informal consensus — was not resolved until well past the halfway point of the voyage, was called by different names by different participants. Bernard called it “the structure problem,” which was accurate as far as it went. Rashida called it “the dependency question,” which was also accurate. Lechat, characteristically, called it “the thing we keep not finishing,” which was the most honest description.

The question, at its core, was: what structure should the contact with Earth have?

Not the physical logistics, not the supply delivery, not the technical deployment of the fabricators. The structure: the relational structure, the power structure, the way in which the Congreve and its three hundred and fifty-one people would present themselves to Earth's survivors and engage with them.

Rashida's position, which she had held and refined since year one, was that any structure the Congreve imposed on the contact would replicate, in some form, the patterns of the Earth system it was trying to move beyond. "We arrive with superior resources," she said, in the second month of year two, at a session that had nominally started as a logistics planning meeting. "We arrive with technology that appears magical by Earth's current standards. We arrive with a philosophy we believe is correct. The combination of those things produces a structural power differential that will shape every interaction we have, regardless of our intentions."

"And your solution is?" Drel asked. He had the patience of someone who had heard a problem clearly stated and is waiting to understand the proposed resolution.

"To be transparent about the differential," Rashida said. "To name it explicitly, to all parties, at the beginning of contact. 'We have more than you. We know we have more. We're here to share it. But we acknowledge that the having-more changes the nature of the sharing.'"

"Is that useful?" Juren asked. He was the other voice in this particular debate — younger than Rashida by twenty years, Chironian-born, with the specific Chironian quality of finding theoretical propositions less interesting than their practical consequences. "Does naming the power differential reduce it?"

"It prevents it from being unacknowledged," Rashida said. "An unacknowledged power differential is worse than an acknowledged one, because it operates invisibly."

"On Chiron it operates by not existing," Juren said. "The structural difference between us and Earth's survivors is that we don't have power differentials in the same sense — no one has more than anyone else in any meaningful way. So our instinct for how to handle them is—"

“Nonexistent,” Rashida said. “Yes. That’s exactly the problem.” She looked around the table. “The Chironians on this ship are the most well-intentioned people I’ve ever known. They are also the people least equipped, by experience, to navigate a situation where the power differential is the dominant structural fact.”

“And the former Terrans?” Colman asked. He had been listening. He often listened in these sessions, taking the lay of the argument before deciding where to add weight.

“The former Terrans have the experience,” Rashida said. “But most of them have spent eleven years actively deconditioning that experience. Which means they’re somewhere in between — they understand what a power differential looks like but may have lost the instincts for how to navigate one that doesn’t involve submission.”

“Submission,” Bernard said.

“When you’ve experienced a power differential as a child, the response patterns are mostly either submission or resistance. You submit to authority or you resist it. The Chironian response — treating authority as contingent on competence and dissolving it when the competence question changes — that’s a third option, but it’s one that most former Terrans learned by seeing it demonstrated, not by inhabiting it from birth.”

“So what do we do with this?” Lechat asked. He had the expression he wore when a conversation had identified a real problem and he was organizing his thoughts about response.

“We train for it,” Rashida said. “We spend the next four years — before we arrive — running exercises that involve navigating power differentials. Specifically, exercises where one group has significantly more resources than another group, and the resourced group has to find ways to transfer resources that don’t create dependency, resentment, or structural hierarchy.”

Bernard looked at the group. “You want us to practice being wealthy,” he said.

“I want us to practice being wealthy in rooms full of people who aren’t,” Rashida said. “Which is a very different skill set.”

The training program that Rashida designed, with substantial input from Colman and Kath and two others, ran for fourteen months and was called, officially, “Contact Preparation” and, unofficially, “the theater,” for reasons that became clear once the sessions started.

The theater involved scenarios. One group played Congreve team members. Another group — typically the former Terrans, who could inhabit the role more naturally — played Earth survivors at various levels of desperation and organization. The Chironian participants played both sides, which was interesting: they found playing the Earth survivors harder than playing the Congreve team, not because the Earth behavior was morally difficult to portray, but because the scarcity-fear that drove it was not in their emotional vocabulary in the same way.

“I keep doing it wrong,” said a young Chironian engineer named Pell, after a session in which he’d played a desperate community leader trying to secure exclusive access to the visiting ship’s resources. “I keep acting like someone who’s afraid of running out of something, but I don’t know what that fear feels like in the body.”

“You’re using the intellectual version,” Colman said. “You know intellectually what scarcity fear looks like. You’re portraying the description rather than the thing.”

“How do I get to the thing?”

“You don’t,” Colman said. “You’ve never experienced it and you can’t reverse-engineer it from the outside. What you can do is understand its behavioral consequences.” He paused. “The behavioral

consequence of scarcity fear is: you do things that seem irrational from the outside because from the inside they're rational responses to the expectation that things will run out. You take more than you need right now because you expect that later there will be less. You cooperate with people who control access because you need them. You resent people who have more than you because their having more implies your having less."

"That last one is zero-sum thinking," Pell said.

"Yes. Zero-sum thinking is the natural product of a zero-sum environment. In an environment where there's genuinely not enough for everyone, your gain is someone else's loss. The thing to understand is that the thinking persists even after the environment stops being zero-sum. Because the thinking is learned and the unlearning requires more evidence than the learning did."

Pell thought about this. "So when we arrive with the fabricators and make the environment non-zero-sum—"

"The thinking doesn't change immediately," Colman said. "People still expect zero-sum, still act zero-sum, still interpret non-zero-sum abundance as a trick or a trap or a temporary condition."

"How long does it take?"

"Depends on the person. Depends on the depth of the conditioning. Depends on how many times the non-zero-sum environment demonstrates that it's reliable." He paused. "It's not a day or a week. It might be years. It might be a generation, for the full cultural shift."

"And we're there for three months."

"We're there for three months," Colman said. "Which is why the fabricators work the way they do — independently, reliably, continuously — and why the six who stay are staying, and why we're

coming back.” He paused. “We’re planting seeds, not growing plants.”

“I know,” Pell said. “I understand the principle. I just—” He looked at his hands. “I want to be better at the theater. I want to be able to be in the room with someone who’s afraid of running out and respond in a way that helps rather than patronizes.”

“The difference between help and patronizing,” Colman said, “is mostly about whether you’re solving their problem or helping them solve it.”

“How do you know which one you’re doing?”

“Ask them,” Colman said. “Ask them what they’re trying to do. Ask them what they’ve tried. Ask them what they think would work. Then help them do the thing they’ve already identified as the right thing, if that’s within your capacity.” He paused. “Don’t arrive with solutions. Arrive with capability, and make the capability available to their solutions.”

Pell was quiet for a moment. “That’s harder than arriving with solutions,” he said.

“Considerably,” Colman said.

Year Three: Alex and the Question of History

The session on Earth’s history that Alex attended in year three, in the educational program Mira ran for the ship’s children, was the fourth of its kind, and it was different from the others because Colman had been asked to participate.

Not to teach — Mira made this clear with the specific Chironian gentleness that accompanied necessary corrections. Not to guide or

structure or provide the authoritative Terran perspective. To be present, as a person who had come from Earth, as someone the children could ask things that they couldn't fully ask from the historical record.

He sat at the edge of the group and tried to be a reference point without being a focal point, which was harder than it sounded.

“What I don't understand,” Tomas said, at a point about halfway through the session, “is how it escalated that fast. The exchange. The files say it went from regional conflict to global exchange in — how many hours?”

“Seventy-two hours for the initial exchange,” Mira said. “The secondary strikes were over approximately six days.”

“How does seventy-two hours happen? Didn't anyone try to stop it?”

“There are records suggesting several attempts at de-escalation,” Mira said. “What the records also show is that the decision-making systems on both sides were optimized for speed of response rather than accuracy of response. The assumption was that whoever responded first would have an advantage.”

“But if everyone responds first—”

“Then everyone responds simultaneously and the advantage disappears and what you're left with is the exchange,” Mira said. “Yes. That's the logic that the decision-makers understood intellectually and were unable to act on because their systems were built for a different logic.”

“Why couldn't they change the systems?” Saan asked.

“Changing the systems required everyone to change at the same time,” Mira said. “Any one party that changed unilaterally was more vulnerable than a party that hadn't changed. So no one changed.”

“That’s a prisoner’s dilemma,” Pell said. He was sitting in on the session — he found the children’s questions more useful than many of the adult discussions.

“An existential one,” Mira said.

Alex had been listening quietly. He said: “What was it like? Before the exchange. In the years before.”

Mira looked at him. Colman looked at him.

“We have the records,” Mira said.

“Records describe from the outside,” Alex said. He was looking at Colman. “What was it like from the inside? What did it feel like to be a person living on Earth in the years before the exchange?”

Colman thought about this. He had been on Earth until the *Mayflower II* left, which was about a decade before the exchange, and he had been eleven years old at departure, which made his memories the memories of a child rather than the memories of an adult who understood what he was seeing. But they were still there.

“Tired,” he said.

Everyone looked at him.

“Most of the things I remember from Earth are tired,” he said. “Not — not dramatic tired. Just the specific quality of a civilization that had been working very hard for a very long time at things that didn’t quite work and had learned to manage the not-quite-working without expecting it to get better.” He paused. “The news was bad, consistently, but in a low-key way. The bad news was background. You didn’t watch the news because you expected to be surprised by it. You watched it to update the background.”

“What kind of bad news?” Tomas asked.

“Resource conflicts,” Colman said. “Water, primarily, in the years I can remember. And energy. And arable land. The usual human competition — just bigger and with more people and faster communication and weapons that had gotten significantly better at being weapons.” He paused. “And there was a specific thing — a cultural thing — that I didn’t have words for as a child but that I understand better now. A kind of—” He searched. “A kind of fatalism. Not depression. Not despair. Just the sense that the future was going to be a diminished version of the present, and the question was how much to expect from it.”

“They didn’t believe it would get better,” Alex said. He said it not as judgment but as identification — as naming something precisely.

“Most people didn’t,” Colman said. “The people who did believe it would get better — there were movements, there were efforts — but they were working against a background assumption that things were, at best, going to be maintained. Not improved. Maintained.”

“And then it got worse,” Saan said.

“And then it got much worse very quickly,” Colman said. “And the people who were positioned to make the decisions that determined how much worse it got — they made those decisions in a context where the background assumption of decline was already there, and the specific pressures of the crisis were immediate, and the decision-making systems were built for speed.”

Alex was very quiet. He was processing something — Colman could tell from the specific quality of his silence, which was different from inattentive quiet and different from uncertain quiet and was the quiet of someone absorbing a piece of information into a structure that’s being built.

“But some people survived,” Alex said. “And the people who survived —”

“Made different kinds of decisions,” Colman said. “In different conditions. Without the old systems available to them, they built new ones. Some of those new systems are better and some are worse, by various measures. But they’re theirs. The survivors built them.”

“And that matters,” Alex said.

“It matters enormously,” Colman said. “The difference between a system you inherited and a system you built under pressure is that the built system is integrated into your experience in a way the inherited one isn’t. The survivors of Earth’s crisis know why their systems work, in a way that people in stable civilizations often don’t.”

“Do we know why ours works?” Saan asked.

“Less than we should,” Kath said from the back of the room — she had arrived at some point in the session and had been listening. “We inherited our system from the Founders, who built it and understood why they built it. But the understanding gets thinner with each generation unless it’s actively maintained.”

“How do you maintain it?” Tomas asked.

“By asking questions like the ones you’re asking,” Kath said. “By understanding where the system came from and what it was trying to solve and whether it’s still solving it.” She paused. “That’s why this session exists. Not to give you the history, but to make you think about what history is for.”

The Shape of the Silence

One evening in year four, when the instruments had begun to detect the first signals from Earth’s system — not the organized transmissions that would come later, but the background electromagnetic noise of a civilization that had reduced itself to

something smaller and quieter than before — Bernard and Colman sat in the signal analysis room and listened to the silence that was not quite silence.

“It’s like a heartbeat,” Bernard said.

“Irregular heartbeat,” Colman said.

“But a heartbeat.” He looked at the instruments. “Before the exchange, Earth’s background emissions were so dense you couldn’t see it as a pattern — it was just noise from a high-emission civilization. This is different. You can see the shape of what’s there.” He paused. “Cities. A few of them, widely spaced. Agricultural areas — the electromagnetic signature of cultivated land is different from wild land, in the microwave and infrared bands. And power — small, distributed power sources rather than the grid emissions of the pre-war period.”

“Survivors,” Colman said.

“Yes.” Bernard looked at the display. “A lot of survivors. More than the pessimistic models suggested.” He was quiet for a moment. “Yuen’s preliminary count, based on the emission signatures, puts the population at between fifteen and twenty-five million. Widely scattered but real.”

Colman thought about this. Fifteen to twenty-five million was a small fraction of what Earth had had before — a number that represented enormous loss, measured from above. But as a number of people in itself, it was comparable to the population of several significant nations.

“Enough to rebuild,” Colman said.

“More than enough,” Bernard said. “The limiting factor isn’t people. It’s knowledge and tools.” He paused. “Which is our particular competence.”

“Do you think we’re going to be enough?” Colman asked.

Bernard looked at him. “Define enough.”

“Enough to make a difference that lasts.”

“I think we’re going to plant things,” Bernard said. “Whether the things grow—” He turned back to the display. “I’ve been thinking about the fabricators from an engineering perspective. The fundamental innovation is not the fabrication technology, which we developed, but the feedstock conversion efficiency, which allows local materials to serve as inputs. That’s what makes them truly distributable — they don’t depend on a supply chain.”

“I know the specs,” Colman said.

“What I’m saying is that the independence from supply chain is the political fact, not the technical fact. A technology that requires ongoing supply from a central source creates a relationship between the supplier and the user. A technology that runs on ambient materials creates—”

“Nothing,” Colman said. “No relationship required.”

“No relationship required,” Bernard said. “And that’s the thing I keep coming back to. The fabricators don’t create dependency. They eliminate it. They’re the first technology in human history that is specifically designed to not create a relationship between the manufacturer and the user.”

“Because of the Chironian philosophy,” Colman said.

“Partly. But partly because it’s the correct engineering solution to the problem of how to deliver abundance without creating a dependency structure.” He looked at the instruments. “The people on Earth are not going to see it that way at first. At first it will look like an incredibly powerful supplier has arrived and is offering them

incredibly powerful products for free. The ‘for free’ part will be suspicious. The ‘incredibly powerful supplier’ part will be the part they engage with.”

“How do we change that?”

“We don’t explain it,” Bernard said. “We demonstrate it. We leave the fabricators behind and we leave the knowledge of how to use them, and over time the fact that the fabricators work without our presence becomes the demonstration.”

“And if it takes too long?”

“There’s no ‘too long,’” Bernard said. “There’s the timeline it takes. That’s the timeline it takes.” He paused. “I’ve been building things for forty years. The things that last are the things that were built right, not the things that were finished fast.”

Colman looked at the instruments, the shape of Earth’s silence resolving itself into something he could read.

“Do you ever regret coming?” he asked.

Bernard considered this. “I came from Earth,” he said. “I have a specific relationship to it that you have and the Chironians don’t. The language of regret doesn’t quite apply.” He paused. “I feel responsible for it. Not responsible in a way that has a clear action attached to it. Responsible the way you feel responsible for something that was yours and that you left and that got damaged while you were gone.”

“It wasn’t your fault,” Colman said.

“No. It wasn’t anyone’s fault in the sense of one person’s specific culpability.” Bernard looked at the instruments. “It was the consequence of a system of choices made by millions of people over many decades, none of whom were specifically responsible for the

outcome and all of whom contributed to it.” He paused. “Which is philosophically accurate and completely unsatisfying as an explanation, because it suggests that the only way to prevent catastrophic outcomes is to reform millions of small choices simultaneously, which is essentially impossible on a controlled basis.”

“Or to change the conditions that make those small choices rational,” Colman said.

“Yes,” Bernard said. “Which is what the fabricators do. They change the conditions. The individual small choices — to hoard, to compete, to restrict access — become less rational because the material conditions that made them rational are removed.” He paused. “The Chironians understood this from the beginning. I understood it eventually. The question is whether Earth’s survivors can understand it fast enough to make different choices before they’ve recreated the same system that produced the catastrophe.”

“In one generation,” Colman said.

“In one generation,” Bernard said.

“What’s the probability?”

Bernard looked at the instruments for a long time. “Better than zero,” he said. “I’m an engineer. Better than zero is enough to make the attempt.”

Linh’s Notebooks

Linh Nguyen kept notebooks of her own, which was not something she had planned to do before the voyage but which had become essential by year two. They were not like Mara’s notebooks — not supply-focused, not numbers-oriented. They were the record of an

ongoing argument with herself about a question that had not resolved.

The question had started as: were the people who destroyed Earth “her people”?

By year three, the question had evolved into something more specific and more uncomfortable: what is the right relationship between historical responsibility and personal guilt?

She was not guilty of the war. She had been conceived after it. Her grandfather — the careful, sincere administrator of the EAF agricultural system — had been dead for twenty years before she was born. The specific individuals who made the decisions that escalated the regional conflict into the global exchange were not her relatives, not her community, not even her nation in any direct sense, given that the EAF in which her grandfather had served had been dissolved two years before her birth, when its surviving population had come to Chiron and become Chironian.

And yet.

The notebooks started with a question at the top of the first page: *If the EAF's survivors had not come to Chiron — if they'd continued the expansion, found another planet, built another version of the system — how long before the next catastrophe?*

The answer she'd developed by year two: not long. The EAF system had the same structural dynamics as the Western Alliance system that it had fought — the same competition for resources, the same tendency to manage scarcity through authority rather than technology, the same capacity for escalation when the competition became sufficiently intense.

The answer she'd reached by year three: not asking the question is the problem.

By which she meant: the catastrophe happened partly because the people inside the system had stopped asking whether the system was worth maintaining. They had substituted loyalty to the system for evaluation of the system. They had treated “this is how things are” as a stable answer rather than an ongoing question.

Her grandfather had not asked the question. He had been loyal to his role.

She was asking the question. She was being loyal to the evaluation.

The difference between her and her grandfather was not moral — they were both trying to do good within the constraints they perceived. The difference was epistemic. She was asking whether the constraints were necessary. He hadn't.

The third notebook began with a different question: *What does it mean to do good work in a world that is built wrong?*

By year four, she had a tentative answer: it means using the good work to build different constraints, not to optimize performance within the existing ones.

She shared this with Kath in year four, in a conversation that lasted most of a Sunday afternoon, when the ship was quiet and the common areas were mostly empty and the light from the external cameras showed a star field of unusual clarity.

“The challenge,” Kath said, “is that the people who need to change the constraints are inside the constraints. You can't see clearly from inside.”

“I can see from inside,” Linh said. “I see clearly. The problem is not vision — it's leverage.”

“Explain.”

“I understand the system I grew up in and I can articulate what’s wrong with it and I can identify the changes that would make it better. But I’m one person inside a large system with a lot of inertia. Individual clear vision doesn’t have enough leverage to change large systems.”

“What does?” Kath asked.

“Changing the conditions,” Linh said. She had reached this conclusion that morning, before the conversation, in the latest notebook entry. “The system changes when the conditions that make it rational change. Not when individuals inside it become enlightened — individuals become enlightened inside systems all the time and the systems absorb the enlightenment and continue. The system changes when the material conditions shift enough that the old system is no longer the adaptive response.”

“The fabricators,” Kath said.

“Yes. The fabricators change the conditions. Not by persuading anyone. Not by demonstrating that a better system is possible. By making the material conditions that produced the old system obsolete.” She paused. “My grandfather would have become Chironian if he’d had the chance. Not because he was persuaded. Because the EAF’s system had no material basis to stand on in a post-scarcity environment.”

“And the people who’ve been surviving Earth’s catastrophe for eleven years,” Kath said. “Their systems have a material basis — genuine scarcity, genuine emergency, genuine need for centralized coordination to manage life-or-death resource decisions. The fabricators change that basis.”

“And the systems change,” Linh said. “Eventually. Incompletely. Not uniformly. But directionally.”

“Not completely,” Kath said.

“Not completely,” Linh agreed. “Because some systems don’t respond to changed conditions — they find ways to maintain the appearance of necessity after the necessity is gone. Chen’s Mountain State might be one of those systems.” She paused. “Or might not. I won’t know until I’m there.”

“Is that why you’re staying?” Kath asked.

“I’m staying,” Linh said, “because the question of what happens to a system that was built correctly for wrong conditions, when the conditions change, is the most interesting question I’ve encountered, and the Mountain State is the best laboratory for it.” She paused. “And because Chen is the most interesting person we’re going to meet, and I think he’s going to tell me things that I can’t find in the notebooks.”

ADDITIONAL SCENES: EARTH

What Vasquez Knew

Three days into the first landing phase, Vasquez invited Colman to walk with her.

This was a specific kind of invitation — not a formal meeting, not a briefing, not anything that would be on a schedule. Just a walk. She led him through the settlement in the morning light, taking the routes that showed different aspects of it: the working routes, where people moved with the specific efficiency of a community that had been pared to its essentials and had rebuilt from there; the quieter routes, where the damage from the early years was still visible in patched walls and repurposed spaces; and finally, the northern edge of the settlement, where the new construction had happened and where the geometry was different — wider, more organized, the work of a community that had started to think beyond survival.

“We built this in year four,” Vasquez said, indicating the new district. “Year one through three we were maintaining what we had. Year four was when we started to think about what we were building toward.”

“What changed in year four?” Colman asked.

“The acute phase of the medical crisis was over — not resolved, but managed. The agricultural system was producing at a level that was genuinely sustainable rather than precarious. We had enough stability to think in sentences longer than ‘what do we do today.’” She looked at the new buildings. “And we had lost enough people by then that the ones who were left were the ones who were there because

they chose to be. The people who couldn't adapt to the new conditions had—" She paused. "Had left, or died, or been subsumed into other communities that better suited them."

"Selection pressure," Colman said.

"Yes." She was quiet for a moment. "The people who are here now are the people who found, in crisis, something worth staying for. That's a specific kind of person. Resilient, obviously. But also — purposeful in a way that's different from the pre-war Southern Reach populations. They know why they're here. They know what they're building."

"Is that good?"

"It's complicated," she said. "It's enormously productive — people who know what they're building build better than people who are just maintaining. But it's also inflexible. People who have survived a crisis by becoming certain about their purpose can become brittle when the purpose needs to change."

"Like when we arrived," Colman said.

"Like when you arrived," she said. "Yes. Our entire system was organized around the management of scarcity. You arrived with an effective solution to the scarcity. And the system didn't immediately know what to do with that." She paused. "Baxter's reaction was not unique. It was the extreme version of something that was broadly present: the feeling that abundance without managed access would destabilize everything we'd built."

"And now?" Colman asked.

She considered. "Now we're three weeks in and the fabricators are working and nobody has died of a fabricator-induced destabilization event." A pause that was almost dry. "The council is starting to see it differently. Not all of them. But enough."

“Vasquez,” Colman said. “What do you want for the Southern Reach? Not what you need — what do you want?”

She looked at him. It was a specific look — the look of someone who doesn’t often get asked what they want, specifically because the asking is unusual, and who therefore has to pause to recall what the answer is.

“Safety,” she said, eventually. “Not security — I know the difference. Security is the absence of threat. Safety is the presence of enough margin that threats are manageable. Safety feels like—” She paused. “Room. The room I told you I’d been learning not to depend on. The room where you can make a mistake and it doesn’t kill anyone.”

“That’s achievable,” Colman said.

“The fabricators help,” she said. “The medical supplies help. The connection to the Vale Federation helps. But those things don’t create safety — they create the conditions that make safety possible. Safety itself is a cultural achievement. It’s the state where people believe they have enough to share without endangering themselves. Belief is harder to engineer than supply.”

“Give them time,” Colman said. “And the reliable supply.”

“I know,” she said. “I know the theory. I’ve been living in the practice for eleven years. The practice is slower and messier than the theory.” She looked at the new buildings again. “But it’s working. That’s the thing I keep coming back to. It’s actually working.”

The Clinic at Two in the Morning

Tara had a habit of being at the clinic at two in the morning.

Not because she was needed there — the clinic operated on a reduced night staff and Tara was not officially on the overnight rotation. But the clinic at two in the morning had a specific quality that she had started to find valuable: the quietness of the ward, the sounds of people sleeping or not-quite-sleeping, the particular intimacy of a space that only exists to help people and which at two in the morning is stripped of its daytime functionality and is just — the space, and the people in it.

She had been a physician on Chiron for nine years. She had seen patients in the full range of conditions that Chironian medicine was equipped to handle, which was extensive, and she had never lost anyone to something preventable. The preventable things were prevented. That was what the medical system was for.

In Nelson's clinic, she had lost two patients in three weeks. Both of them were preventable in the sense that the required medications existed, were known, were manufacturable — and had simply not been available in time. One of them had been a seventeen-year-old boy with a bacterial infection that would have been treated in minutes on Chiron. He had died because the clinic's antibiotic stock had been exhausted two days before the Congreve's first delivery.

She sat with this. Not dramatically — it was not in Tara's character to be dramatic about things — but with the specific Chironian completeness of someone who does not look away from difficult facts.

The boy's name was Leo. He had been seventeen and had had, she'd been told, an interest in electrical engineering and the particular dark humor of adolescence, and he had been sick for four days before he died and had understood, at the end, what was happening.

She sat with this in the quiet clinic at two in the morning and felt the specific quality of a grief that was not personal — she had not known Leo, had arrived after his death — but was structural. The grief was

about the gap, the preventable gap, the gap between what existed and what had been available here.

And then she looked at the fabricator against the back wall, and she felt the gap closing.

Not closing instantly. Not closing completely. But the fabricator was there. It was running. The antibiotics it was producing were in the dispensary. The next person who came in with the infection that killed Leo would leave with the compound that saved them.

She wrote in her notes that night: *I understand now why Colman calls this 'planting seeds.' Not because the metaphor is elegant. Because seeds are the thing that changes without you being there to watch it change. You put the seed in and you leave and the growth happens on its own. You can't stop it. You can't speed it up. You can only make sure it's in.*

The fabricator is in. That's the thing that matters.

What Alex Read

There was a moment, six weeks into the Earth visit, when Alex disappeared for an afternoon.

Kath found him in the evening in the community building's reference room, which was a space that had formerly been a teacher's office and was now a collection of the Southern Reach's surviving physical texts. He was sitting at the corner table with a stack of books beside him that he had apparently worked through systematically.

"What are you reading?" Kath said.

Alex held up the book he was currently in. It was a pre-war community planning manual, practical and specific, aimed at local

government administrators. *Building Community Resilience: A Practitioner's Guide*.

“Why that?” she asked.

“Because it was written before,” he said. “Before everything changed. And I wanted to understand what they thought resilience meant when they wrote it.”

She sat down. “What did they think it meant?”

He turned to a page he'd marked. “Here,” he said. “‘Community resilience is the sustained ability of a community to utilize available resources to respond to, withstand, and recover from adverse situations.’ Available resources.” He looked up. “That’s the definition they were using. Resilience as the ability to use what you have.”

“And?” Kath asked.

“And the people who are here now — the people who have been surviving for eleven years — they have that completely. They are incredibly good at using available resources. Better than anyone I’ve ever seen. Mara can look at a supply situation and immediately identify every inefficiency and every optimization.” He paused. “But the definition has a problem in it.”

“What problem?”

“It’s about using what’s available,” he said. “Not about creating what isn’t. It’s a defensive definition. Resilience as the ability to survive scarcity, not as the ability to eliminate it.” He looked at the book. “The people who wrote this were thinking about communities that would always have limited resources, and so resilience meant surviving those limits. But the limits themselves weren’t in question.”

“Chiron’s definition would be different,” Kath said.

“Chiron’s definition is something like — the ability to make available what’s needed,” Alex said. “Not the ability to endure having less than you need, but the ability to produce enough that the endurance isn’t required.” He looked at the other books in the stack. “I’ve been trying to figure out where the switch is. The conceptual switch. When you go from thinking ‘how do we survive with what we have’ to thinking ‘how do we make sure we have what we need.’”

“The fabricators,” Kath said.

“That’s the practical switch,” Alex said. “The fabricators change the material conditions. But the conceptual switch is different — it’s the moment when the people here stop thinking in survival mode and start thinking in abundance mode. And that happens separately from the material conditions. People can have material abundance and still think in survival mode.”

“Yes,” Kath said. “They can.”

“That’s Baxter,” Alex said.

“Yes,” Kath said. “That’s Baxter.”

“And it’s going to be most people here, for a while,” Alex said. “Even with the fabricators running. Even with the supply situation addressed. They’re going to keep thinking in survival mode because survival mode is what they know.”

“Yes,” Kath said.

“So what changes it?” he asked. “Not the material conditions, apparently. Not just those. What actually changes the thinking?”

Kath was quiet for a long time.

“Experience,” she said. “Repeated, reliable experience of not running out. Experience of the fabricator being there tomorrow and the day

after and the week after that. Experience of things being okay when you didn't ration. The conceptual switch happens when the evidence accumulates past the point where the old model can absorb it."

"How much evidence?"

"Different for different people," Kath said. "Some people make the switch quickly. Some make it very slowly. Some—" She paused. "Some never make it fully. They can be surrounded by abundance for decades and still act as if things might run out."

"Like the people on the Mayflower II who never went fully Chironian," Alex said.

"Like them, yes." She paused. "Your father nearly didn't. For a while."

Alex looked at her. "What stopped him from not?"

"He made a series of choices," Kath said. "Not one big choice. A lot of small ones, each of which moved him slightly in the right direction. And the environment — Chiron, the people on it, the reality of how it worked — the environment was doing the work, over time." She paused. "He arrived with a lot of very old conditioning. It took years to revise."

"And he did revise it."

"Substantially," Kath said. "Not completely — no one does completely. But enough." She looked at her son. "Which is what we're hoping for here."

"Not complete," Alex said. "Enough."

"Enough," Kath said. "Enough to sustain different choices. Enough to make a different kind of system possible."

Alex looked at the book in his hands. Then he put it on the stack. “I’m going to take this back to the ship,” he said.

“The manual?”

“I want to annotate it. Write the Chironian definition in the margins. Not to correct it — to have both versions on the same page.” He paused. “So I can see where they diverge and where they meet.”

“That’s a good project,” Kath said.

“It’s a long one,” he said.

“That’s why it’s good,” she said.

Torres and the Water System

The conversation between Torres and Colman that shaped the water infrastructure project happened by accident, in the third week, when Colman was walking back from the northern district and Torres was checking a pressure reading on one of the distribution pipes that ran along the roadside.

Torres was on his knees with a diagnostic tool, with the specific focus of someone doing something practical that he’s been doing for years and knows how to do right. He looked up when Colman’s shadow fell over him.

“Problem?” Colman asked.

“Pressure variance,” Torres said. “Happens periodically at this junction. Usually resolves itself. I like to check anyway.”

“How old is this pipe?”

“Pre-war,” Torres said. “Most of the main distribution system is pre-war. We’ve replaced some of it — the worst sections. The rest we maintain.”

“What happens when the pre-war pipes fail?”

“We repair them with whatever we have. Patch materials, mostly. The patches hold for a while.” He looked at the junction. “We need new pipe. We know we need new pipe. We’ve been managing with what we have because we don’t have the manufacturing capacity to produce new pipe at the scale we’d need.”

“The fabricator can produce pipe,” Colman said.

Torres looked at him. “Plastic pipe?”

“Composite material pipe,” Colman said. “Higher-grade than pre-war plastic — corrosion-resistant, pressure-rated to well above your distribution system’s operating pressure. We can run the specs through the fabricator and start producing sections—”

“How long would it take to replace the main distribution system?”

“That depends on the total pipe footage and the installation labor available,” Colman said. “The fabrication itself—” He did a quick calculation. “At current output rate, probably two months to produce the full pipe inventory for the Nelson main system.”

Torres was very still.

“Two months,” he said.

“For production,” Colman said. “Installation is a separate timeline.”

“We have installation crews,” Torres said. He was still very still. “We have people who know this system. They’ve been patching it for eleven years.”

“Then they can install it,” Colman said. “We can walk them through the fitting specifications.”

Torres stood up slowly. He was looking at the pipe junction with an expression that was difficult to read precisely — not happy, not exactly. Something more interior than happy. “We have a five-year plan,” he said. “For the water system. We drew it up in year seven. At our current replacement capacity, we’d need five years to replace the worst sections of the distribution system.”

“And now?”

“And now—” He stopped. He was recalculating, visibly. “And now it’s two months for production and another six for installation, which is eight months total.” He paused. “That’s not five years. That’s less than a year.”

“Yes,” Colman said.

Torres was quiet for a long time. He was looking at the pipe junction, and then at Colman, and then at something beyond either of them — something in the middle distance where the future was being revised.

“What else can the fabricator do?” he said. It was not a greedy question. It was the question of a person who has been managing constraints for eleven years and is discovering, rapidly, that the constraints are different than he thought.

“Tell me what your five-year plan covers,” Colman said. “And we’ll work through it.”

The Evening with Vasquez

On the sixty-first evening in Nelson — two days before the departure preparations began — Vasquez invited the Congreve’s surface team

to dinner.

It was a genuine dinner, not a formal event — cooked in the community kitchen by a rotating group of volunteers, served in the large common room with tables pushed together to accommodate everyone. The food was excellent in the way that post-war food is when the agricultural system is working: locally grown, thoughtfully prepared, without variety but with quality.

There were fourteen people at the tables: Vasquez, Torres, Park, two other council members, Tara, Fen, Juren, Ora, Colman, Kath, Alex, Tomas, and Mara, who had been invited at Alex's suggestion and who had come with her notebook under her arm as usual and who had quietly put it away when the food arrived, which was a sign of something.

The conversation moved through the practical — what had been accomplished, what the handover looked like, what the volunteers would need in the first weeks — and then, as dinner conversations do, moved into something less specifically functional.

Vasquez asked Colman, at one point: “What’s the hardest thing you’ve done here?”

He thought about it. “Not the hardest,” he said. “The hardest was watching Dr. Petrov’s clinic on the second day, when the two patients who were past saving died. That was hard in a way that’s specific and clear.” He paused. “The more complicated thing — not hard exactly, but complicated — has been holding the equal distribution principle in the face of argument.”

“Baxter,” she said.

“Baxter. And others. People who make good-faith arguments that the principle is wrong for specific reasons. Arguments I can understand and partially agree with.” He paused. “Holding a principle under genuine pressure from intelligent people who have reasonable

objections — that requires you to have thought through the objections more carefully than the objectors.”

“Have you?”

“I think so,” Colman said. “But I’m not certain. The uncertainty is part of the work.”

Mara was listening from the far end of the table. He’d seen her tracking the conversation. When he paused, she said: “Can I ask something?”

“Yes,” he said.

“The equal distribution principle,” she said. “You give the same assistance to Chen’s mountain people that you give us. Even though Chen’s system—” She paused, picking her words carefully. “Even though Chen’s system is organized in ways yours isn’t.”

“Yes,” Colman said.

“Why not give more to communities that are more like yours? That are more — democratic, more open, more aligned with what you’re trying to do?”

It was, Colman reflected, the most sophisticated version of the question he’d been asked. More sophisticated than Vasquez’s version, which had been political. More sophisticated than Baxter’s version, which had been security-focused. Mara had gone straight to the philosophical core.

“Because,” he said, “if we decide who gets more based on our assessment of which communities are more aligned with our values, we’ve made ourselves judges. And judges have power. And power over resource distribution is the thing we’re trying to get rid of.”

“But you could do more good—”

“We could do more fast good,” he said. “More immediately, measurably beneficial good. But the downstream consequence of being the arbiter of who gets what based on value alignment is that we’ve recreated the exact structure we’re trying to leave behind. A powerful agent deciding who deserves access based on ideological criteria.”

Mara thought about this. “That’s what the EAF did,” she said.

“In a different direction, with different criteria,” Colman said. “But structurally, yes.”

She nodded slowly. She looked at her hands on the table — the hands that had been keeping records for four years, the hands that had picked up a stone from the beach on the morning of the first landing. “So the principle protects you from becoming what you’re trying to change.”

“Yes,” he said.

She sat with this for a moment. Then she picked up her fork and went back to her dinner, and the conversation moved on to other things, and Colman watched her from across the table with the specific attention he gave to things that were settling into place in exactly the way they should.

The Children on Departure Day

The morning of the final departure, Alex found Tomas and Saan in the atrium of the community building, which they’d been using as a gathering space throughout the surface visit in the same way they’d used the ship’s atrium — a point of convergence, a place to process things.

Tomas was sitting with his knees pulled up, looking at the light through the building's glass roof. Saan was standing at the edge of the space, looking out the window at the settlement.

"You okay?" Alex asked.

"I met my cousins," Tomas said. "Three of them. In Melbourne. They're doing — they're doing fine. The agricultural community there is actually quite good." He paused. "But they're different from what I expected. I had this — picture. From my parents' stories. And the real people are different from the picture."

"Better or worse?" Saan asked.

"Different," Tomas said. He used Alex's word deliberately, aware of what it meant. "They're shaped by what they survived. I'm shaped by growing up on the ship and on Chiron. We're cousins but we're not — we're not similar in the ways cousins are supposed to be similar."

"There's no supposed to in this," Alex said.

"I know," Tomas said. "That's what I'm processing." He looked at the roof. "I wanted to feel at home here. I wanted it to be home the way my parents described it. And it isn't. It's—" He paused. "It's theirs. Not mine. But also it's part of what I am, somehow. Because my parents are from here and I came from them." He paused. "It's complicated."

"Everything worth understanding is complicated," Saan said. This was true and slightly impatient, which was Saan's mode when she was also processing something and didn't have the patience for extended uncertainty.

"What about you?" Alex asked her.

She turned from the window. "I want to stay longer," she said.

“We can’t,” Alex said.

“I know we can’t. I want to, though.” She looked at the settlement through the glass. “There’s so much here. So many questions that are right here on the surface — not resolved, not finished, in process. On Chiron everything is — steady. Stable. The questions are all internal, philosophical, about what to do with abundance and freedom. Here the questions are about whether you get to live. Whether you get to eat. Whether you get to have a future that’s different from the present.” She paused. “Those are urgent in a way that makes them very clear.”

“Would you rather live here?” Alex asked. He was genuinely asking.

She thought about it for a long time. “No,” she said, finally. “I don’t want to live with the urgency. I want to understand it. There’s a difference.” She paused. “Maybe when I’m older. Maybe when the urgency here is less because they’ve solved more of the material problems. Then it would be a place to learn things I can’t learn at home.”

“In ten years,” Alex said. “When we come back again.”

“In ten years,” she said.

Tomas stood up. “We should go,” he said. “The shuttle.”

They went. Alex looked at the atrium as he left — the plants, the light, the geometry of a space that had been built for function and had become, over three months, a place where the children of one civilization had tried to understand another. He thought it was not the worst thing that could happen to a building.

THE RETURN VOYAGE: ADDITIONAL SCENES

Bernard's Assessment

Six months into the return voyage, Bernard produced what he called his technical assessment of the Earth contact phase and what Lechat called “the most comprehensive after-action report ever written by someone who was supposed to be running a ship.”

It was forty-two pages.

It covered the fabricator deployment, the archive transfer, the pharmaceutical emergency response, the water system replacement project in Nelson, the structural engineering assessment of several Southern Reach buildings that had been done as part of the deployment planning, the shuttle pilot training program, and the technical training program for local fabricator operators.

At the end of the forty-two pages, there was a section titled “What Worked and What Didn't,” which Bernard had written in his most direct register:

What Worked: The fabricators performed to specification and beyond. The open-access model produced the expected initial friction and the expected subsequent reduction in friction. The pharmaceutical manufacturing program addressed the acute medical shortage within the planned timeline. The archive transfer was complete and verified. The inter-community exchange program between the Southern Reach and Vale Federation began

independently of the Congreve's facilitation within six weeks of first contact, which is better than I projected.

The six volunteers are in place and appear to be doing good work by the reports we've received. Linh's decision to stay in the Mountain State specifically was correct. I didn't fully understand it before she left. I understand it better now.

What Didn't Work: The equal-distribution principle encountered more operational friction than planned. The Southern Reach's security apparatus — Baxter specifically — represented a genuine threat that required a response that was not fully anticipated, though the ship's pre-installed protocols handled it well. The boarding attempt could have been more serious if the protocols had been less complete.

The scattered communities — the small points on the map that represented the majority of Earth's surviving population in absolute terms — were substantially underserved. We visited two of them. We identified seventeen others as viable contact points. We reached none of them directly. The six volunteers have contact protocols for some of these communities, but the scale of the underservice was larger than I was comfortable with. This is the most significant operational gap of the mission and it should be the focus of the next contact mission.

Recommendation: The second contact mission should be larger, longer, and more focused on the scattered communities. It should include a dedicated shuttle team specifically for distributed outreach. It should carry more fabricator units and more volunteers.

Timeline recommendation: Three years from now, not five. Earth is changing faster than our baseline models predicted. The Southern Reach is changing. The Mountain State is changing. The things we

planted are growing. The second contact should happen while the growing is still early enough to shape.

Lechat read this in the communications room and wrote one word in the margin of the recommendation section.

Agreed.

A Conversation About Chiron

Three months before arrival back at Alpha Centauri, Lechat found himself in the common area after dinner with two Chironian passengers who had been quiet through most of the voyage's return phase — a young man named Arav who had been the oldest of the children's group and who was now fourteen, and a woman named Hesta who was forty-six and who had come on the voyage because she wanted to see Earth for reasons she had described as "insufficient to articulate but real."

"What did you think?" Lechat asked Hesta.

She thought about it with the Chironian deliberateness. "I thought it was smaller than the files suggested," she said. "Not physically smaller. But smaller in its possible futures. The files are historical — they describe a civilization at a specific moment of its possibilities. What I saw is a civilization that has had its possible futures reduced by catastrophe, and is working to re-expand them."

"Is that sad?" Arav asked.

"It's accurate," Hesta said. "The sadness is in the gap between what the civilization could have been and what it is. The gap is large. But the direction of movement is—" She paused. "The direction is promising. The communities we visited are moving toward more possible futures rather than fewer."

“We helped,” Arav said.

“We contributed,” Hesta said. “The helping is theirs. We gave them better tools. The work is theirs.”

Lechat listened. He had the expression he wore when he was thinking about something he hadn’t quite resolved.

“What’s troubling you?” Hesta asked. It was a Chironian question — direct, without social softening, asked because the answer would be useful.

“The question of what we brought back,” Lechat said.

“The archive,” Arav said.

“More than the archive.” Lechat looked at the table. “What we brought back — what I brought back — is a different understanding of what a mission can be. I went to Earth as a commander. I came back as—” He paused. “As someone who doesn’t know what to call what I am now, in relationship to Earth.”

“You’re responsible for it,” Hesta said.

“Yes,” Lechat said. “That’s the word. But responsibility without clear authority, without a defined role, without a structure that makes the responsibility actionable—”

“That’s the Chironian condition,” Arav said.

Both Lechat and Hesta looked at him.

“On Chiron,” Arav said, “everyone is responsible for the things around them without having authority over them. You respond to what’s needed because you’re capable of responding and it’s needed, not because it’s your role or your jurisdiction.” He paused. “We

learned to operate that way by growing up in it. You're learning it now."

Lechat looked at the fourteen-year-old. "Yes," he said. "I am."

"It gets easier," Arav said, with the specific confidence of someone stating an empirical observation. "Once you stop expecting the responsibility to come with a defined role."

"Does it?" Lechat said.

"I assume so," Arav said. "I've only ever had the responsibility without the role, so I can't compare. But it seems to work."

Lechat smiled. It was a specific kind of smile — the smile of a man who has been told something accurate by someone he hadn't expected to say it. "Yes," he said. "It seems to work."

Alex at Twelve

On his twelfth birthday — two months before they reached Alpha Centauri — the ship's company organized a small gathering in the atrium. This was Tomas's doing, primarily, executed with the practical thoroughness of someone who had grown up making things happen with available materials.

Alex was mildly embarrassed by the gathering, which was the appropriate response for someone whose personality was fundamentally more interested in other people than in occasions organized around himself. He sat through it with the good-natured patience he'd developed for situations that were for other people's benefit rather than his.

The gift from the engineering section was a miniature working scale model of the Congreve's antimatter drive, built to Bernard's

specifications, which was technically impressive and which Alex looked at with the appreciation of someone who found it beautiful in the way that functional things are beautiful.

The gift from Tomas and Saan was a jointly produced notebook — physical, like Mara’s, hand-stitched, with blank pages ready to receive whatever he decided to put in them.

“For the questions,” Tomas said.

“For the answers,” Saan said.

“Both,” Alex said.

He looked at the blank first page for a long time that evening. Then he wrote a title at the top of the first page:

What Earth Knows That Chiron Doesn’t

He looked at the title. Then he wrote the first entry:

That scarcity makes things real. Not that scarcity is good — it isn’t. But that the experience of not having enough forces a precision of attention that abundance allows you to let go of. Mara knows the water allocation for every district of Nelson. She knows it because she has to. I know general system principles. She knows specific facts. Both matter. I want to know more specific facts.

He looked at this. Then he added:

The stone is in my pocket. It’s been in my pocket for two months. It weighs the same as it did the first day.

He closed the notebook. He would add to it later. He had a long time ahead of him to add to it, and the voyage was almost over, and Chiron was waiting — its blue-green light familiar and specific, the world he’d grown up in, the world whose questions were the

questions of abundance and freedom rather than scarcity and survival.

Both kinds of questions were real. Both kinds mattered.

He was twelve. He had time.

The Archive

The technical archive from the Mountain State was a dataset of extraordinary density and completeness. When the Congreve's information systems analysts finished the initial catalogue review six weeks into the return voyage, their summary document was twelve pages long and included the phrase "unprecedented" eleven times, which Lechat noted and which Bernard said was probably an undercount.

The materials science library alone contained the complete published and unpublished work of four of the pre-war world's leading materials research programs, including several proprietary datasets that had never been made public — datasets that, according to the Chironian analysts who reviewed them, addressed questions in molecular assembly theory that Chiron's own researchers had been working on for twenty years.

"We've been solving problems they already solved," said Yuen, who was leading the review. She said it without affect, as an observation rather than a judgment. "Different approach, same destination. In some cases we went further than they did in certain directions, but there are areas — specifically in feedstock conversion chemistry — where they were significantly ahead of us."

"And they destroyed it," Colman said.

“They didn’t destroy the knowledge,” Yuen said. “They destroyed the civilization that was generating the knowledge. The knowledge itself survived because Chen built an archive.” She paused. “And the archive survived because Chen had the foresight to protect it. And Chen had the foresight because he’s the kind of person who protects things of value even while destroying the context that produced them.”

“That’s a complicated sentence,” Colman said.

“He’s a complicated person,” Yuen said.

“Yes,” Colman said. “He is.”

The physics library had three specific documents flagged by the technical team as potentially relevant to the ongoing Chironian research program in stellar-level antimatter applications. These documents were classified in the original archive — military research, theoretical work on propulsion systems that the pre-war military had funded for reasons that had nothing to do with science and everything to do with the geopolitical ambitions of the moment. The science was good regardless of the original motivation. Three of Chiron’s physicists had read the three documents within twenty-four hours of being told they existed, and two of them had stopped sleeping for a week.

“Is that a positive response?” Lechat asked Bernard.

“Physicists who stop sleeping are always a positive response,” Bernard said.

The archive was transmitted to Chiron in a continuous data stream that began three months before arrival and was received by the Chironian communications network and distributed to the university’s technical departments as received. By the time the Congreve entered the Alpha Centauri system, approximately fourteen research groups at the university had already opened file

requests for specific sections of the archive, and the library's catalogue system had been updated to include the archive in the publicly accessible collection.

Chen Yi-jun's name was on the provenance note for every document in the archive. It would remain there.

[End of Additional Scenes]

CONTINUATION_1

THE EARTH VISIT: EXTENDED SCENES

The Shape of Chen's Day

Linh had been in the Mountain State for nine days when she began to understand Chen's actual role.

The formal structure was clear enough: General Chen Yi-jun, commander of the Mountain State, operational authority over the resource allocation and governance systems that had kept six hundred thousand people alive for eleven years. The structure had an organizational chart, which was the first one she'd seen outside of pre-war historical archives. It was precise and clear and it had Chen at the top.

What wasn't on the chart was how Chen spent his actual days.

He woke at five. She knew this because the light in his office came on at five-fifteen, and the Mountain State's facilities manager had told her that the general's office was the only one that had a manually controlled light rather than a timer-controlled one, because Chen had said early on that the pattern of who needed to be where when should emerge from what the work required, not from the schedule.

By six he had reviewed the overnight reports from the seven district managers — all of whom sent summaries at oh-four-hundred, which was the Mountain State's system. By six-thirty he had responded to the three or four that required response, and had flagged two or three for follow-up later in the day.

The rest of the morning was meetings. Not formal meetings with scheduled agendas and minutes taken — though those existed — but

the specific kind of meeting that happened when Chen was moving through the facility and someone stopped him with a question. The questions were often technical: a pressure variance in the water system, an anomaly in the grain storage records, a request from one of the district managers for an exception to the standard allocation protocol.

He answered all of them. Not summarily — he listened, he asked clarifying questions, he considered, and then he gave a specific answer that addressed the actual problem rather than the presented problem. This was the skill, Linh was beginning to understand. Chen's specific skill was not command. It was diagnosis.

“He's doing what a good engineer does,” she told Soru, in one of their evening conversations, during the second week. “He's looking at the symptoms, asking about the system state, and finding the actual fault rather than the surface one.”

“And he does it for everything,” Soru said. “Not just the technical systems.”

“He does it for social systems,” Linh said. “Personnel conflicts, allocation disputes, the friction that builds up when you have six hundred thousand people living under centralized management. He reads those the same way — looks for the actual structural fault under the surface complaint.”

“And he fixes them,” Soru said.

“He addresses them,” Linh said. “The difference matters. He makes the specific decision that addresses the specific situation. He doesn't change the system that's producing the situations.”

“Because he built the system,” Soru said.

“And because the system worked,” Linh said. “That's the thing. The system he built is functional. It works. By the evidence — six hundred

thousand people alive, maintained infrastructure, no significant internal conflict — it is a working system. The fact that it would work better with different principles doesn't make the working argument easy to defeat.”

“But you're going to try,” Soru said.

“I'm not going to try to defeat the argument,” Linh said. “I'm going to try to show him a different kind of evidence.” She paused.

“Specifically, I'm going to help him set up the next open community meeting and I'm going to count the ideas that emerge from it that are better than the ones Chen would have come to by himself.”

“And you expect there to be some.”

“I expect there to be several,” Linh said. “He's very smart. But six hundred thousand people are smarter in aggregate than any individual, and they know their local conditions better than any central administrator can. When he discovers that opening the decision-making produces better outcomes—”

“He'll trust the process,” Soru said.

“He might,” Linh said. “Or he might identify the specific conditions under which opening the decision-making produces better outcomes and those under which it doesn't. Which would actually be more useful.”

Soru looked at her. “You genuinely don't know which way it's going to go.”

“That's why I'm here,” Linh said. “If I knew how it was going to go, I could have sent a report.”

The third open community meeting of the Mountain State happened in the sixth week of the Congreve's Earth visit, and Linh attended.

Chen had called it with three days' notice, as before, and the attendance was four hundred and seventy-three people — larger than either of the first two. He had learned, Linh thought, the lesson that visibility creates trust: the more often he demonstrated his willingness to have the meeting, the more people believed the meeting was real rather than performative.

The agenda was: the revised food allocation structure, as proposed by the community working group.

The working group had been formed at the second meeting, which had been in week three, and had consisted of twelve volunteers — some of them experienced in the allocation system, some of them not. They had met seven times in two weeks and had produced a proposal.

The proposal had two key changes from the existing system: First, it replaced the central allocation calculation with a district-level calculation that allowed local adjustments for specific community needs within a global ceiling. Second, it established a public appeal process for allocation decisions, with appeal handled by a three-person panel selected by lot from the community rather than by appointed officials.

Chen read the proposal publicly and then was quiet for a very long time.

The room waited.

“This is better than what I had,” he said.

The room was very quiet.

“The district-level adjustment provision is something I should have implemented three years ago. I didn't because the administrative complexity seemed higher than the benefit. Having reviewed the working group's proposal, I think I was wrong about that

calculation.” He paused. “The appeal process is also an improvement. I’ve been the appeal process for eleven years. I don’t think that’s served people well — not because I’ve been corrupt or unfair, but because an appeal to the person who made the original decision is structurally biased in ways that undermine the purpose of appeal.”

He paused again.

“I’d like the working group to expand the proposal to cover energy allocation as well,” he said. “I’d like a second working group on the technical certification system. And I’d like to formally establish a mechanism for proposing structural changes to the governance system, which can be used by any community member, with a defined review process.” He looked at the room. “These are the changes that I can implement unilaterally, that don’t require anyone’s vote to put in place. I’m putting them in place.”

He looked at the proposal on the table. “The appeal process, specifically — I want to be clear about this. I’m creating a body that can override my decisions. That’s not something I did in year one, two, three, four, five, six, seven, eight, nine, ten, or eleven. I’m doing it now because the proposal is correct, not because I was pressured.” He looked around the room. “Any questions?”

There were forty-seven questions. He answered all of them. The meeting lasted four hours.

Linh sat through all of it and took notes and said nothing, which was the correct approach for someone who has been invited to observe and who would rather the observation remain untainted by her presence as a facilitating agent.

Afterward, walking back to the engineering facility where she’d been working, she wrote in her notebook:

He gave up the appeal authority voluntarily. He described it precisely and accurately. He said it was not because of pressure. I believe him. The question I haven't answered yet is whether he did it because he genuinely believes it's better, or because the Chironian visitors made 'not doing it' feel more costly to his self-image than doing it.

But then: maybe the mechanism doesn't matter. The result is the same regardless. The appeal body exists. It will hear cases. It will sometimes overturn Chen's decisions. He'll live with that. And the people who use the appeal process will learn that it's real, and the learning will accumulate into trust, and the trust will be the foundation for whatever comes next.

That's the Chironian principle: the mechanism produces the culture, over time, regardless of the motivation for creating the mechanism. You don't need perfect motives. You need the right structure.

I think I'm starting to understand why Kath isn't afraid of Chen.

The Fallows Connection

Bernard's relationship with Earth was complicated and specific, and Colman spent some of the departure-preparation days thinking about what it meant.

Bernard had been born on Earth. His children had been born on the Mayflower II, during transit. His grandchild Martin had been born on Chiron. Three generations, three worlds — and Bernard was the node, the person who bridged all three. He carried the Earth in a way that the Chironian-born didn't and in a different way from the former Terrans who had come back specifically because they wanted to see what had happened.

Bernard had not particularly wanted to see what had happened. He had come because he was the chief engineer and the ship needed him, and because he was, in the end, the kind of person who goes where the work is. But he had also come because Earth was his origin and the origin exerts a gravity that no amount of adopted civilization fully offsets.

What he had found had been harder than he'd expected and more hopeful than he'd feared, which was roughly where he'd landed on the question.

“What do you tell Jay?” Colman asked him, three days before departure, when they were doing the final check on the shuttle mechanical systems.

“About what we found?”

“About what you saw. You'll talk to him when we get back. He'll want to know.”

Bernard ran a tool along a panel seam, checking for irregularity. “I'll tell him it's alive,” he said. “Which I wasn't certain it would be.” He paused. “I'll tell him that the people who survived are — remarkable. Not because they're extraordinary people. Because they're ordinary people who endured extraordinary conditions and are now doing extraordinary things with the ordinariness that survived.” He paused. “I'll tell him that Vasquez is the best manager I've ever seen, and I've seen Bernard Chen Yi-jun, so that's significant.”

“Better than Chen?”

“Different from Chen. Chen manages from authority. Vasquez manages from relationship. The relationship model is better for building community but it requires you to actually have relationships with the people, which Chen doesn't.” He checked another seam. “I'll tell Jay that the water pipe replacement project in Nelson was the most satisfying engineering work I've done since the antimatter

drive.” He paused. “Because it was the most obviously needed. The drive was a theoretical achievement, a beautiful problem well-solved. The water pipe was — people are going to drink clean water that doesn’t get contaminated by corroding pipe. That’s concrete in a way the drive isn’t.”

“And Martin?” Colman said. “Jay’s son?”

“Martin is two years old and won’t understand most of what I tell him until he’s much older,” Bernard said. “But I’ll tell him about the locomotive anyway. Jay’s locomotive running on tracks that go nowhere in particular and everywhere that’s interesting, and the people who ride it just to ride it, because on Chiron the ride is the point rather than the destination.” He looked at his tool. “Earth used to understand that. There were whole movements, philosophies, cultural traditions built on the idea that experience has intrinsic value rather than instrumental value. The crisis stripped that out. Everything became instrumental. Every action justified by its outcome.” He paused. “The fabricators will give them time back. Time that doesn’t have to be justified. And that time is where the rest comes from — the things worth doing for their own sake.”

“That’s an optimistic projection,” Colman said.

“Yes,” Bernard said. “But it’s an engineered optimism. Not a wished one.” He moved to the next panel. “The pipe is in the ground. The fabricators are running. The archive is transferred. The six volunteers are placed. Those are structural facts, not hopes.” He paused. “Jay will want to know that the structure is right. He’s an engineer too, in his way. He’ll understand that once you get the structure right, the outcomes are downstream from the structure, not from will.”

“And what if the structure isn’t enough?” Colman asked.

“Then we go back and fix it,” Bernard said. “That’s what engineers do.”

Park at the Communications Center

Park managed the Southern Reach's communications network from a facility at the edge of Nelson that had been built in year three, when the original city hall that had served as the first communications center was repurposed for food processing. The new facility was a cluster of converted warehouse spaces, with a roof forest of antennas and relay equipment that had been salvaged, rebuilt, and innovated over eleven years into something that resembled the pre-war internet in its distributed structure and exceeded it in its reliability for local conditions.

She had come to the communications role by accident — she had been a network engineer before the war, working on civil infrastructure, and when the crisis had started she had been the only person within a hundred kilometers who understood how to keep the radio systems running. She had kept them running for eleven years, which meant she had been present for every major communication event of the Southern Reach's history: the first contact between the New Zealand communities after the exchange, the formation of the confederation, the discovery of the Melbourne and Montevideo survivor groups, the first contact with the Vale Federation, and now the Congreve.

Of all the events in her eleven years, she had found the Congreve contact the strangest.

Not in a bad way. Strange in the way that something is strange when it fundamentally revises your model of what's possible.

“The model I had,” she told Colman, on one of his walks through the settlement, “was of our civilization as a closed system recovering from damage. The available inputs were what we had, modified by what we could produce from what we had. The system was

improving, slowly, within those bounds.” She paused. “Your arrival wasn’t within those bounds. It was an input from outside the system. Which — in principle I knew that was possible. An outside input. But in practice, in eleven years, it hadn’t happened, and I’d stopped modeling it as a live option.”

“You were surprised,” Colman said.

“Not just surprised. Conceptually disrupted,” she said. “I had to rebuild the model. From the beginning. Not just update the parameters — actually rebuild, because the basic architecture assumed a closed system and the architecture was wrong.” She paused. “I’ve been running communications for eleven years and I thought I understood our communication situation completely. I didn’t know about Chen’s satellite. I didn’t know he’d been tracking your approach for three years. I didn’t know the Vale Federation had maintained a long-range antenna array.” She looked at the antenna forest on the facility roof. “I thought I was the communications person. And I was — for our system. But our system was not the whole picture.”

“How does that change things?” Colman asked.

“It makes me question what other systems I’m not aware of,” she said. “What other inputs are possible that I haven’t modeled. What connections exist that I haven’t established.” She paused. “The inter-community exchange program is part of it. The Vale Federation connection — I’ve been sending daily updates to Schafer since you set it up, and she responds within the hour. I’ve learned more about the Vale Federation in six weeks than in the previous eleven years.” She looked at him. “What else don’t I know about yet?”

“That’s a very good question,” Colman said.

“I know,” she said. “Do you have an answer?”

“No,” he said. “But the habit of asking it is more important than having a specific answer.” He paused. “Mira told me something like that, actually. About education.”

“Mira — the historian on your ship?”

“Mira is one of the teachers on the ship,” Colman said. “She runs the children’s education program. She has a specific philosophy about it: organize around questions, not curricula. The value of the education is in the quality of the questions students learn to ask, not in the specific information they learn to recall.”

Park thought about this. “That’s different from how we do it,” she said.

“How do you do it here?”

“Curricula,” she said. “We have specific things that children need to know. Technical things, mostly — the practical skills required to maintain and operate the community’s systems. The curriculum is driven by what the community needs from its members.”

“What would happen if you introduced question-based education?”

Park was quiet for a moment. “Some of the children would be very good at it,” she said. “Some — the ones who are good at the curriculum because they’re good at learning specific facts to solve specific problems — might struggle with it. It’s a different kind of thinking.”

“Both kinds are needed,” Colman said.

“Yes,” Park said. “Mara is good at both,” she added.

“I know,” Colman said. “She’s unusual.”

“She gets it from her mother,” Park said. “Adira is the best diagnostician we have. She knows the specific facts — the medical inventory, the synthesis protocols, the patient histories. But she’s also the one who asks questions none of the rest of us thought to ask.” She paused. “Like when she asked, three years ago, whether the antibiotic shortage might be related to an agricultural practice in the southern district rather than to a supply chain failure. It was. The livestock antibiotic runoff was contaminating the water supply in a way that accelerated bacterial resistance in the human population. Nobody else made that connection.”

“She asked why,” Colman said.

“She asked why,” Park said. “And then she traced the why until she found the answer.” She looked at the antenna forest. “When I told her about your communication with Chen’s satellite — about the fact that he’d been running an observation platform for eleven years — she was the one who said: ‘What else has he been observing that we haven’t been observing?’ She started asking about his data holdings before anyone else thought to.”

“That’s why Kath wanted to meet her,” Colman said.

Park looked at him. “I didn’t know that.”

“Kath asked me which person on the Southern Reach was most likely to understand the long-term implications of what we were doing,” Colman said. “I said Vasquez. Kath said she’d already talked to Vasquez. She wanted the next level down — the person who was seeing things Vasquez wasn’t focused on.” He paused. “I said Petrov. And Kath said she’d add Mara’s recommendation to the file.”

“What file?”

“The file of people who might come to Chiron,” Colman said. “Eventually. In the long term.”

Park was very quiet for a long time. “She’s seventeen,” she said. She was thinking of Mara without Colman having to specify.

“She’ll be older,” Colman said. “And she’ll want to come. When she’s ready.”

“How do you know?”

“Because she asked me about Chiron,” Colman said. “Not once. Multiple times. Different questions each time — technical questions, social questions, questions about the education system and the fabricator system and the agricultural organization. She’s been building a model of it.”

“Building a model,” Park said.

“Yes,” Colman said. “Like an engineer who’s not sure if the design will work but wants to understand it well enough to know whether it’s worth trying.”

The Night Before Departure: Colman’s Thoughts

He lay awake on the last night in Nelson and tried to account for what had happened.

Ninety-four days. In ninety-four days, the following things had occurred:

The Southern Reach’s pharmaceutical deficit had been addressed to approximately sixty percent. Seventy-three critical patients had received compounds that would not otherwise have been available. Eleven deaths that would have occurred without intervention had not occurred. The remaining pharmaceutical deficit would be addressed by the two fabricator units currently operational and the

three in installation, assuming continued feedstock availability, within an estimated four months.

The Nelson water system replacement had begun. Fifteen percent of the primary distribution network had been replaced with new-material pipe. At current installation pace, the remaining eighty-five percent would be completed within eighteen months. Torres had the plan.

The Southern Reach / Vale Federation exchange program had produced its first student cohort. Twelve students in Innsbruck. Twenty-eight students expected to follow in the next semester. Professor Schafer had sent a communication describing the first meeting between the Southern Reach students and the Vale Federation faculty as “productive and surprising in the best possible way.”

The Mountain State archive had been transferred in full. The index and annotation were complete. The distribution to all communities had begun via the Southern Reach’s communications network — Park’s network — which had the reach and the reliability to be the distribution infrastructure.

The Mountain State had held three open community meetings. A working group had produced a governance proposal. Chen had accepted it and expanded it. The appeal body was being organized.

Six Chironian volunteers were in place.

Mara had a fabricator in her pocket.

He lay in the dark and thought about what had not happened.

The scattered communities — the faint lights on the map — had received no direct contact. There had been indirect reach: Park’s network now included several of the more reachable ones. The fabricator units going into the Southern Reach would produce

surplus that could be shared with some of them, when the transportation could be organized. The Vale Federation's communication reach covered some of the Alpine communities that had been isolated from the Southern Reach.

But there were lights on the map that were farther out, more isolated, less connected. Small communities in central Africa. In central Asia. In the interior of the South American continent. In the Pacific islands that had been, pre-war, entirely dependent on supply chains that no longer existed. These communities existed. The Congreve's instruments had found them, or found evidence of them. And the Congreve was leaving.

He thought about the people in those faint-light communities.

He thought about what eleven years of complete isolation looked like from the inside. Without contact, without exchange, without the knowledge that anyone else was managing. Just the specific community, its resources, its organizing principle, its daily arithmetic of survival.

He thought about what it would mean to those communities to know the Congreve had come and gone and had not come to them.

He thought about whether it was better to not know, or to know.

He thought about the second mission. Three years, Bernard's report had said. Maybe five. The second mission needed to be larger, to stay longer, to reach the faint lights.

He would make sure the report was heard. He was not the mission planner — Lechat was, and the Chironian planning council was, and the decision was not his to make alone. But he had the specific standing of someone who had been there and who had seen what needed to be seen, and that standing was not nothing.

The room was quiet. The Southern Reach night sounds — insects returning to their territories, the distant movement of the water system through its pipes, the wind off the mountains — were the background of a world trying to be alive, and being alive with whatever tools it had.

He thought about Mara at the river, watching the current.

He thought about the stone, smooth and specific, in his son's pocket.

He thought: good enough. For now. Come back and do more.

He slept.

The Congreve Departs

The departure from Earth's orbital space was unannounced in the formal sense. There was no ceremony, no final message to the surface. The Congreve simply executed its departure burn at the planned time, on the planned trajectory, and began the six-year voyage home.

On the bridge, Lechat sat in the commander's chair and watched the departure on the forward displays. Earth was visible for the first three hours of departure burn — a blue-grey sphere, cloud-wrapped, with the specific quality of a world that had been very old for a very long time and was now also recovering from something, which was a different kind of age.

Then it was too small to resolve as a disk and was a point of light, and then it was not distinguishable from the rest of the field, and they were in deep space again.

He remained on the bridge for two hours after Earth was no longer visible, running through the departure checklist and confirming the

navigation solution and doing the other things that commanders do when they're departing a location that carries a weight and they've decided the best response to the weight is to keep working.

Yuen came in at hour two. She was the mission analyst, and she had the specific quality of someone who works with data and has learned to let data tell her things she hadn't asked.

"Preliminary mission assessment," she said, and sat down with her handscreen.

"Give me the summary," Lechat said.

"The preliminary assessment is: we did more than I expected and less than was needed, in roughly equal measure." She looked at her screen. "The medical intervention exceeded baseline projections by approximately forty percent. The fabricator deployment exceeded baseline by roughly thirty percent. The archive transfer exceeded baseline completely — we got everything, which was not certain." She paused. "The distributed community contact was approximately twenty percent of baseline. The baseline was already conservative. We reached a very small fraction of the scattered population."

"Yes," Lechat said.

"The political stabilization in the Southern Reach — the Baxter situation — resolved better than median probability suggested. The Mountain State engagement was more productive than the most optimistic scenario projected. The Vale Federation integration exceeded expectations." She set down the screen. "The main underperformance is the scattered communities. The main overperformance is Chen."

"Chen surprised everyone," Lechat said.

"Chen surprised me specifically," Yuen said. "I'd modeled him as resistant to Chironian-model engagement. He wasn't resistant. He

was—”

“Interested,” Lechat said.

“More than interested. Active.” She paused. “The three open community meetings in six weeks — I had that projected as a two-year outcome. He did it in six weeks.”

“What changed his mind?”

Yuen thought about this. “I think Kath’s meeting with him,” she said. “And Linh’s arrival. Two people who saw his system from the outside and were neither afraid of it nor trying to dismantle it — who understood what he’d built and why, and engaged with it as a genuine engineering achievement rather than as a political problem to be corrected.” She paused. “He’s been surrounded, for eleven years, by people who either served him unquestioningly or feared him. Kath and Linh did neither. They evaluated his work and told him where it was right and where it wasn’t.”

“He wanted someone to evaluate his work,” Lechat said.

“He wanted someone capable of evaluating his work and who would tell him the truth,” Yuen said. “Which is a different requirement. It requires both competence and honesty. In his system, competence and the ability to tell him the truth are in tension — the people with enough standing to tell him the truth have it because he’s given them the standing, which creates a reporting relationship that complicates honesty.” She paused. “Linh had the competence and had no obligation to the system. The combination made her uniquely positioned.”

“And she chose to stay,” Lechat said.

“She chose to stay,” Yuen confirmed. “Which is, from an analytical perspective, exactly the right choice.” She picked up her handscreen. “The second mission brief is going to be interesting to write.”

“Start with the scattered communities,” Lechat said.

“Already started,” she said, and left.

What Tomas Said

Two months into the return voyage, Tomas came to find Colman in the engineering section.

He was fourteen now — tall in the way of adolescents who are growing faster than they expected, with the outdoors quality of someone who had spent real time on a real planet in real weather. He had come to the engineering section with the hesitant purpose of someone who has been thinking about something for a while and has decided to bring it out.

“Can I ask you something?” he said.

“Yes,” Colman said.

“My cousins,” he said. “In Melbourne. They’re—” He paused. “They’re good people. They work hard. They care about their community. By every measure I know how to apply, they’re doing well.”

“Yes,” Colman said.

“But they’re also—” He stopped again. “They’re scared in a way I don’t know how to relate to. Not scared of specific things. Scared in a general way. Like the background of their life is this low-level expectation that things might go wrong at any time, and the right response is to be careful and not get too invested in anything going well.”

“Scarcity fear,” Colman said. “Generalized.”

“Yes,” Tomas said. “And I didn’t know how to—” He looked at his hands. “I kept wanting to say: you don’t have to be afraid. The fabricators are there. The supply situation is improving. It’s going to be okay. And then I realized that saying that was—”

“Insufficient,” Colman said.

“Empty,” Tomas said. “Because they’ve been told it was going to be okay before. Multiple times. By people who believed it and were wrong. The Southern Reach Council told people in year three that the pharmaceutical situation was under control. It wasn’t. The agricultural board told people in year six that the harvest was going to exceed projections. It didn’t.” He paused. “So when I said ‘it’s going to be okay,’ what they heard was ‘this person doesn’t know the history.’”

“Yes,” Colman said.

“So what do you say instead?”

Colman thought about it. “You don’t say anything instead,” he said. “You’re not the one who gets to tell them it’s going to be okay. You’re the one who—” He paused, finding the right framing. “You’re the one who has the tools that make it more likely to be okay. And you give them the tools, and you show them how the tools work, and you make sure they understand the tools don’t require you to be present. And then you leave. And over time, with the tools, they have evidence — not your word, evidence — that things are actually getting better.”

“And the fear goes away?”

“The fear gets smaller,” Colman said. “Because fear that’s based on evidence responds to better evidence. Not immediately, and not completely, and not for everyone. But directionally.”

Tomas was quiet for a moment. “I want to go back,” he said.

“I know,” Colman said.

“Not now. I know we just left. But when the second mission goes—”

“Talk to Lechat,” Colman said. “He’s already planning it.”

“Really?”

“The second mission is going to be different from the first,” Colman said. “Larger. Longer. More focused on the places we didn’t reach.” He paused. “Your cousins in Melbourne — the second mission probably goes to Melbourne. If you’re on it, you’ll see them again.”

Tomas was quiet. Then: “Melbourne wasn’t in the scattered communities. We went to Melbourne briefly.”

“We went to Melbourne,” Colman said. “We didn’t install a fabricator unit there. We didn’t set up the exchange program. We passed through.” He paused. “The second mission doesn’t pass through.”

Tomas nodded slowly. “Okay,” he said. “I’ll talk to Lechat.”

He went. Colman returned to the drive monitoring system. The instruments showed everything within specification. He adjusted one parameter slightly — a routine calibration, the kind of thing that was easy to miss if you weren’t paying attention, that could accumulate into something significant over six years if you let it.

Small adjustments. Sustained attention. The systems that matter are the ones you keep running, every day, over time.

What Saan Understood

Saan was ten when they left Earth and eleven by the time she’d worked through what she’d learned there.

The working-through took four months, which she spent in the quiet way she did things — not obviously processing, not discussing, not writing it down, but visibly in the state of someone for whom the background is occupied by something that foreground activities sit on top of.

When she came out of it, she talked to her father.

Drel was in the atmospheric cycling room, which was the part of the engineering section that he was specifically responsible for, and he was doing a maintenance calibration on one of the secondary scrubbers. He moved over to make room for her on the bench.

“I’ve been thinking about what we’re going to go back to,” she said.

“Chiron,” he said.

“And what it means,” she said. “What it’s going to mean, to be back there, after being here.”

“Tell me,” he said.

“The thing I keep coming back to is—” She paused. “On Chiron, I always knew that people came from Earth. I knew about the Mayflower II and the Founders and the embryo program. I knew the history. But knowing the history didn’t make Earth real. It was— historical. In the past. Something that happened before and that led to Chiron but that wasn’t happening anymore.”

“And now?”

“And now Earth is a specific place where specific people are doing specific things,” she said. “And those things are happening right now, at this moment, while we’re on this ship. Mara is at the river path or at the clinic or looking at her notebook. Torres is checking the water system pressure. Vasquez is in the council meeting. All of that is happening right now.” She paused. “I’ve never had that feeling

before. The feeling that there's something happening somewhere else that matters, that's ongoing."

"Connection," Drel said.

"Yes," she said. "Connection. And it makes Chiron feel different. Not smaller — not like it matters less. But less — complete. Less of a whole thing and more of a part of something." She looked at the scrubber. "Before Earth, Chiron was the world. After Earth, Chiron is a world."

"How do you feel about that?" Drel asked.

She thought about it. "Good," she said. "I feel good about it. Because a world that's connected to other worlds has more — more to be part of. More to understand. More to care about." She paused. "But also sad. A little. Because Chiron on its own was simpler."

"Simpler was comfortable," Drel said.

"Yes," she said. "Simpler was very comfortable." She paused. "I think I'm done with simple, though. Or simple is done with me."

Drel was quiet for a moment. Then he said: "Your grandfather — my father — he was one of the Founders. Not the inner circle, but part of the early Chironian community that established the fabricator access system."

"I know."

"He used to say — I was very young when he said this — he used to say that the hardest part of building a civilization is deciding what to preserve from the previous one, and that most civilizations get this wrong by preserving too much. They carry everything forward, including the parts that should have been left behind."

"And what did he think Chiron preserved correctly?"

“The curiosity,” Drel said. “He said the embryo program preserved human curiosity — the capacity for wonder, the drive to understand — but by luck of circumstance rather than design, it failed to transmit the things that suppress curiosity. The hierarchy that tells you what to think. The authority that punishes questions. The scarcity that makes thinking feel dangerous.” He paused. “He thought Chiron was a good accident.”

“And Earth’s survivors?”

“Are making their own choices about what to preserve,” Drel said. “And some of those choices will be good and some will be bad and the interesting thing is watching which ones turn out to be which.”

“That’s why you came,” Saan said. She was looking at him.

“I came because I wanted to see,” he said. “Yes. Not for any more complicated reason than that. I wanted to see.”

“And you saw.”

“I saw.” He returned to the calibration. “And now I’ll spend the next twenty years of my career trying to understand what I saw.”

The Departure and the New Weight

The Congreve left Earth with a specific new weight that was not physical — not a matter of mass, which the departure burn accounted for precisely — but perceptual, the weight that comes from having been somewhere that now existed in memory rather than at a distance.

Before the visit, Earth had been — for the Chironian-born members of the crew — a concept. A historical fact, a source of their genetic

inheritance, the place from which their civilization had been seeded. Abstract and significant.

After the visit, Earth was a place where Tara had watched a boy die of a preventable infection and then spent three months addressing the system that had made his death preventable-but-unavoidable. A place where Vasquez had walked Colman through the settlement in the morning light and explained what eleven years of survival felt like from the inside. A place where Mara had sat at a river and calculated supply numbers and given a stranger a stone.

The abstraction was gone. The concept had been replaced by specifics.

This was, Kath observed in one of her evening conversations with Colman, the most important thing the mission had accomplished, and it was the thing that was hardest to quantify.

“The six volunteers are there,” she said. “The fabricators are running. The archive is transferred. Those are the things that show up in Yuen’s assessment. But the thing that doesn’t show up—”

“Is that we saw it,” Colman said.

“That we saw it,” Kath said. “And came home with the seeing. And will never be able to think about Earth in the abstract again.” She paused. “And the people on Chiron who talk to us about what we found — they’ll get the secondhand version. Not the seeing. But the seeing filtered through people who saw.”

“It’s better than the files,” Colman said.

“Everything is better than the files,” Kath said. “The files describe from the outside. We saw from the inside. That’s a qualitatively different thing.”

“And the second mission,” Colman said. “Whoever goes — they’ll have heard from us, from the six, from Linh. They’ll go with a richer picture.”

“They’ll still see something different from what we told them,” Kath said. “Earth is going to be different in three years from what we left.”

“Faster?” he asked.

“Almost certainly,” she said. “The fabricators are in. The exchange programs are starting. The archive is being distributed. The Mountain State opened three community meetings in six weeks.” She looked at the star field. “Things are growing. Growing is faster than establishing.”

“Or it falls back,” Colman said.

“Or some of it falls back,” Kath said. “That’s possible. The Southern Reach has political instability that Baxter’s failure didn’t fully resolve. The Mountain State has a transition process that could stall. The scattered communities have all kinds of dynamics we don’t know about.” She paused. “But the fabricators keep working. Whatever else happens, the fabricators keep producing.” A pause. “That’s the structural fact I keep coming back to. Whatever happens politically, the tool keeps running. And the tool changes what’s possible regardless of what the politics does.”

“You sound like Bernard,” Colman said.

“Bernard is right about the things he’s right about,” Kath said. “Which is most things.”

Year Five of the Return: What Alex Wrote

At seventeen, Alex opened the notebook that Tomas and Saan had given him for his twelfth birthday and read what he'd written in the first pages. He had written more in the intervening five years — the notebook was full and he was into a second one — but he started with the first page and read forward.

The entries were specific and scattered: observations from the Earth visit, questions he'd been working through, ideas that had occurred to him during engineering shifts, conversations he'd had with people on the ship about what they'd found. He read through them with the specific quality of someone reading their own older thinking and finding it simultaneously more and less adequate than expected.

More adequate because the observations were good — the specificity he'd brought to the Earth visit had produced a record that was more useful than he'd known at the time. Less adequate because he'd understood less, at twelve, than he thought he had, and some of the conclusions he'd drawn at the end of Earth entries were too neat, too resolved, too confident about things that had turned out to be more complicated.

The entry about Mara was the longest in the first section. He'd written it in several sittings, over the days after departure, when the processing had still been ongoing.

Mara keeps notebooks because the records are important and because the notebooks are private. I keep notebooks because I'm trying to understand things and writing helps the understanding.

The difference between us: she starts from the specific and builds toward the general. I start from the general and look for the specific that tests it. Her method is more reliable. Mine is faster. Both have failure modes.

Mara's failure mode: she doesn't record what she wants, only what is. She can describe the supply situation with perfect accuracy and not know what she's hoping for.

Mine: I generate hypotheses quickly and look for confirming evidence. I can miss the disconfirming evidence if I'm not careful.

The stone is the specific thing she gave me. Not the general thing — not “a piece of Earth” or “something to remember us by.” A specific stone, from a specific beach, that she picked up on the specific morning of our arrival because she thought I might need something from Earth. That's her thinking: specific, purposeful, for a specific reason that she had thought through.

My things — the fabricator I gave her — are general purpose. Make anything you can describe. That's my mode.

She'll make specific things. She'll use it for the things she's thought through. The things that matter right now, in the way that right-now things matter when you've grown up counting calories.

I want to see what she makes in five years.

He read this and then wrote below it, in the second notebook, in his current handwriting:

Five years later: I still want to see what she makes. The second mission is being planned. Bernard submitted the recommendation. Lechat is building the team. I have not been invited to the planning committee because I'm seventeen and I'm useful in the engineering section. I'm going to make the case for being on it when I'm eighteen.

Mara is sixteen. She's in Innsbruck. Park's communication network relays her messages to the Congreve. The last one said: “The Vale Federation's materials science program is good. Schafer knows things about pre-war materials research that the files don't have.

I've been doing fabricator experiments in the university lab and I think there's an efficiency improvement available in the feedstock conversion step. I'll send the analysis."

She sent the analysis. It was correct. Yuen sent it to the Chironian materials science group, who confirmed it. There's a paper being drafted. Mara's name is on it.

She's sixteen and she has a published paper in the Chironian technical library. She figured it out using the fabricator I gave her, in a university lab, in the mountains of Austria.

That's a seed, he wrote. That's exactly a seed.

He closed the notebook. He looked at the observation deck window — Chiron's system was ahead, close enough to show the distinctive blue-green of the planet at maximum magnification. Three months away.

He reached into his pocket and felt the river stone — smooth, specific, heavy with its specific weight. He had carried it for five years. He would carry it home.

FURTHER SCENES: THE FULL TEXTURE OF ARRIVAL

Three Days Before

The attempted boarding by the Southern Reach Security Council happened on a Thursday morning, but the three days before it had a texture that Colman only fully appreciated in retrospect.

Day one: Baxter missed the morning logistics meeting. Torres covered for him with the explanation that he had a conflicting commitment. Torres's manner when delivering this explanation was slightly more careful than his usual manner, which meant Torres knew more than he was saying. Colman noted this without commenting on it.

Day two: Park sent a communication to Kath through the open relay asking whether the Congreve had any special communication protocols for distress situations. It was framed as a general administrative question about emergency procedures. It was not a general administrative question.

Day three: Mara's notebook entry. Alex had read him the relevant portion: the Security Council facility, the overnight staffing change, the Wellington people in non-standard accommodation.

Looking back at it, Colman could reconstruct the decision tree Baxter had been working through. The fabricators were operational and their output was going to people without his oversight. The user-privacy protocol meant he could not know who was producing what. The ship's authentication system meant he couldn't access the ship's

production capabilities directly. The political route — going to the council for a formal decision to restrict fabricator access — was not available to him because the council had voted to accept the open-access policy when it was proposed.

Which left the direct route: take the ship, or the people on it, and negotiate from that position.

It was not a stupid plan. It was a plan based on accurate intelligence — Baxter knew the Southern Reach's shuttle capacity, knew the Congreve's approximate crew deployment on the surface, knew the timing of the watch rotation. The forty-seven people he'd organized were not random — they were the Security Council staff and the Wellington community members who had the most training in organized action. The plan was, from a tactical standpoint, reasonable.

What Baxter didn't know was that the Congreve had been designed by people who had spent a significant portion of the voyage's planning phase on exactly this scenario.

The planning session had happened in year three of the voyage, in the Level Two conference room, with Bernard, Fen, Juren, Kath, and three other Chironian specialists. Colman had not been part of this session. He'd learned about it afterward, from Kath, in the way he learned about many things — as information provided when it became relevant rather than as disclosure made for its own sake.

The session had started with a question: what's the most dangerous thing a surface-based actor can do to the mission?

The answers had been considered systematically:

Destroy the fabricators: possible but requires significant technical capability; the fabricators are hardened against physical attack.
Mitigation: siting, monitoring, backup units.

Intercept the shuttle supply runs: possible but requires organized surface-to-air capability; surface-to-air capability is essentially nonexistent in post-war conditions. Mitigation: minimal.

Take control of personnel on the surface: possible and likely if there's a motivated actor. Mitigation: situational awareness protocols for ground team, safe egress procedures, secure communications.

Take the ship: requires shuttle capability to reach orbit, then authentication and access capability. Mitigation: authentication protocols, ship configuration.

It was the ship-taking scenario that had received the most attention, because it was the scenario with the highest consequence if it succeeded and the highest probability of being attempted if there was a capable and motivated actor.

Bernard had designed the authentication and access systems. Juren and Fen had designed the ship's interior configuration.

The interior configuration was the part that Baxter hadn't anticipated.

The Congreve's corridors could be reconfigured by the ship's AI within approximately ninety seconds. The reconfiguration worked by selectively opening and closing the secondary hatches and cross-corridors — the ship had significantly more internal pathway options than were typically used — and by rerouting corridor-lighting in ways that made navigation unintuitive for people unfamiliar with the non-standard configuration.

The effect was that the ship, from the inside, became a labyrinth. Not impenetrable — given enough time and enough maps, anyone could navigate it. But enough to make unauthorized entry time-consuming and frustrating, which, combined with the authentication refusal at the docking bay, would make the boarding attempt fail before it had started.

Fen had explained this to Colman afterward, calmly, in the way that Chironians explained things that they had thought through carefully and found satisfying from an engineering perspective.

“We also,” Fen had said, “modified the electromagnetic environment around the docking bay.”

“Modified how?” Colman had asked.

“The docking bay’s external approach zone has a field-emitting system that produces a moderate electromagnetic interference pattern when activated. Not enough to damage electronics — that would be too aggressive. But enough to affect vehicle navigation systems, which operate in the affected frequency bands. An unauthorized vehicle trying to maneuver in the approach zone will find its navigation slightly degraded.”

“Slightly.”

“Noticeably,” Fen said. “Not dangerously. But enough to make precise maneuvering in the approach zone uncomfortable and time-consuming.”

“So they couldn’t get to the bay doors.”

“They could get to the bay doors,” Fen said. “The doors simply wouldn’t open. And the approach to the doors was more difficult than they’d planned for.”

Colman had been quiet for a moment after this explanation. “How long did all of this take to design and implement?” he’d asked.

“The authentication systems were in the original design,” Fen said. “The interior reconfiguration was added in year two. The electromagnetic approach field was the most recent addition — we put it in during the final service period, about six months before departure.”

“You’ve been thinking about this since year two,” Colman said.

“Since year one, actually,” Fen said. “Year two was when we had the planning session. Year one was when Kath first raised the scenario.”

“She raised it in year one,” Colman said.

“Yes,” Fen said. “She said that the history of the Mayflower II suggested that any encounter between a resource-rich party and a resource-poor party had a non-trivial probability of producing a coercive attempt by the resource-poor party to take what was not being shared on their terms. She wanted the ship to be able to respond without violence.”

“Without violence,” Colman said.

“The response to the boarding attempt involved no weapons, no threats, no confrontation of any kind,” Fen said. “The ship simply wasn’t there for them. The corridors didn’t lead where they expected. The bay didn’t open. The navigation was difficult.” A pause. “The ideal response to an attempt to take something by force is to make the force irrelevant without engaging it.”

This, Colman had reflected, was very Chironian. It was also very effective.

The Day After the Boarding

The day after the boarding attempt was — quiet.

There was no public announcement. The Security Council issued no statement. Vasquez’s office did not send a communication. The community went about its morning with the specific focused efficiency of a community that had learned to put its head down and do the work, whatever was happening in the background.

Colman spent the morning in the engineering annex, running drive diagnostics that did not require running — the drive was fine, had been fine, would be fine — but which gave him something precise to do with his hands while he waited to see what would happen.

What happened, at 1100, was Baxter.

He came alone, which was either a gesture of good faith or the recognition that bringing people would have been pointless. He came to the community building's main meeting room and asked to see Lechat.

Lechat was there.

The conversation lasted ninety minutes. Colman was not present, but Lechat gave him the full account afterward, in the spare and precise style he used for accounts of significant conversations.

Baxter had opened with: "I owe you an explanation."

Lechat had said: "I'd prefer understanding to explanation, if you're willing."

Baxter had been quiet for a moment. Then he had said: "The understanding is that I spent eleven years making sure this community had what it needed, and then you arrived with something that changed the terms of what 'having what it needed' means, and I had not prepared for that change."

"Specifically?" Lechat had asked.

"Specifically: I had power because I managed access to scarce resources. When you removed the scarcity, you removed my power. And I reacted to that by trying to assert control over the new resource — your ship, your fabricators — which was wrong, and which I knew was wrong while I was doing it, and which I did anyway because—" He stopped. He had the expression, Lechat said,

of someone being more honest than they expected to be. “Because the alternative was accepting that I’m not essential anymore. And I don’t know what to do with not being essential.”

Lechat had been quiet for a long time.

“You kept this community alive for eleven years,” he had said.

“Yes,” Baxter had said.

“And the skills that kept it alive — the intelligence analysis, the security protocols, the information systems—”

“Are still useful,” Baxter had said. “That’s not the question. The skills are still useful. The question is whether I still get to decide who knows what and who has access to what.”

“And the answer is?”

“The answer is that I lost that yesterday,” Baxter said. “When the boarding failed. Not because I tried and failed — because I tried and the failure demonstrated that the ship is designed so that no one person can control it. Not you, not me, not Vasquez. The ship controls itself, according to principles that were set by the people who built it, and no one on the ground has authority over it.” He paused. “That’s what I couldn’t accept. That’s what I still find difficult.”

“What do you find difficult about it?” Lechat asked.

“Control,” Baxter said. “The principle of control. That the right response to a complex system is not to understand it well enough to manage it, but to let it run according to its own principles and trust the principles.” He paused. “I’ve been managing a complex system for eleven years. The system ran because I managed it. You’re telling me there’s a different way.”

“I’m telling you that we’ve found a way that doesn’t require a manager,” Lechat said. “Whether it’s better or worse depends on your values, I think.”

“Is there something in between?” Baxter asked. “Not your way, not my way. Something in between?”

This was, Lechat told Colman, the moment the conversation became interesting.

“There might be,” Lechat had said. “The appeal body that Chen is setting up in the Mountain State — that’s something in between. Centralized enough that the system is coherent, open enough that individuals can contest decisions.” He paused. “The Southern Reach already has something similar in the council structure. What you don’t have is transparency into the fabricators’ outputs.”

“Which you can’t give me,” Baxter said.

“Which the fabricators won’t give you,” Lechat said. “The privacy protocol is in the hardware. But you can have the aggregate output data — what’s being produced, in what volumes, at what rate. That tells you whether the system is being used, whether the usage pattern is healthy, whether something anomalous is happening.” He paused. “It doesn’t tell you who, but it tells you what.”

Baxter had been quiet for a long time. “That’s something,” he said.

“It’s the available something,” Lechat said. “Would you like to work out how to implement it?”

They had spent the remaining fifty minutes working out how to implement it.

When Colman heard this, he thought that Lechat’s ability to turn a crisis into a working group was one of the more useful capabilities any mission commander could have. He said as much.

“It’s not a skill,” Lechat said. “It’s just the observation that most conflicts are about unmet needs rather than fundamental incompatibility. Find the need and address it, and the conflict resolves.”

“Baxter’s need was information,” Colman said.

“Baxter’s need was the feeling of control,” Lechat said. “The information is a proxy for the feeling. I gave him a form of information that was available and that addressed the feeling without creating new problems.” He paused. “He’s not going to be the last person who has that need. Chen has it. Several Southern Reach council members have it. It’s a very human need — the need to know what’s happening.”

“The fabricators’ privacy protocol makes that impossible for specific outputs,” Colman said.

“It makes it impossible for certain kinds of information,” Lechat said. “But there’s a lot of information available that isn’t that kind. The people who want to know what’s happening — if they’re honest with themselves — mostly want the aggregate picture. They want to know the system is working and what it’s producing. They don’t really need to know who specifically is using it.”

“Baxter needed to know who specifically,” Colman said.

“Baxter was used to knowing who specifically,” Lechat said. “Which isn’t the same thing as needing it.” He paused. “He’s going to be okay. He’s a competent person who needed to understand that his competence was still needed in a different form. Once he understands that, the crisis disappears.”

“Do you think he understands it?” Colman asked.

Lechat thought about it. “He’s starting to,” he said. “It takes more than one conversation. But he’s starting.”

Mara and the Fabricator: What She Made

The record of what Mara produced with the personal fabricator in the two years between the Congreve's departure and the pickup voyage is incomplete, but Park compiled an account from the messages that came through her network, supplemented by Mara's own communications.

The first things she made were practical: replacement components for two pieces of medical equipment at the clinic that had been running below spec for lack of replaceable parts. She learned the fabricator's specification system in three days — it had taken the adult fabricator operators in Nelson five — and produced the components to tolerance. Petrov had them installed within the week.

After the practical things, she made tools. Tools for the clinic, tools for the communications center (Park had given her a list), tools for the materials science lab at the Southern Reach university where she was completing her education. The tools were good — better than what was available, because they were made to exact specifications rather than adapted from available materials.

The fabricator experiments she wrote about in her message to the Congreve were the third phase. She had been thinking, since the Congreve visit, about the feedstock conversion efficiency. The fabricator used a molecular assembly process that started from locally available materials and built toward the target specification. The process had an efficiency limit in the conversion step — some fraction of the feedstock was lost as heat during the assembly. The question was whether the conversion process could be optimized to reduce the loss.

She had approached this question with the method she had learned in seventeen years of keeping notebooks: start with the specific

numbers. What exactly was the efficiency? Where exactly was the heat loss occurring? Were there variations in the loss rate that correlated with specific target specifications?

The analysis she sent to the Congreve was twenty-three pages. It was precise, well-organized, and contained an insight that the Chironian materials scientists had not seen before: the heat loss was not uniformly distributed across the conversion process but concentrated in a specific step related to heavy-element assembly. The step could be modified by reordering the assembly sequence for heavy elements, reducing the thermal signature and improving overall efficiency by approximately eight percent.

Eight percent was significant.

The paper that Yuen had mentioned, with Mara's name on it, went into the Chironian technical library. It was accessed three hundred and forty-two times in the first year, which was a high access rate for a new technical paper in that database. The citation record, when Alex looked at it on the fifth anniversary of their departure from Earth, showed it had been cited in eleven subsequent papers, including two from Chironian researchers who had extended the efficiency improvement to adjacent processes and found similar gains.

From a small fabricator in a university lab in southern Austria, by a seventeen-year-old who had grown up counting calories in Nelson.

That was a seed.

The Southern Reach One Year Later: What Park Reported

Twelve months after the Congreve's departure, Park sent a comprehensive report through the inter-community relay to the

Congreve's comms team. It was her practice — she had been maintaining the report schedule since the day the ship lifted, because she understood that the information connection mattered and that maintaining it was her specific contribution to making it real.

The report covered seven areas: medical status, agricultural status, fabricator operation status, water infrastructure status, community exchange program status, security situation status, and political situation status.

Medical: the pharmaceutical deficit was now projected to be fully addressed within four months at current fabrication rates. The clinic in Nelson had expanded its capacity based on the improved supply situation. Three regional clinics in more remote communities had received fabricator training and were operating secondary production units, with materials transferred from the Nelson unit while their own units were being installed.

Agricultural: no major issues. The summer harvest was two percent above the projection made at the time of the Congreve visit. The improved irrigation components from the fabricator program were credited with the improvement.

Fabricator operation: twelve units operational across the Southern Reach, all running within specification. Three additional units in installation phase. Usage patterns had stabilized. The initial high-demand period — the weeks when people had queued for the fabricators — had given way to a steady usage pattern with no significant spikes. The aggregate output data (which Baxter now reviewed weekly, in the arrangement worked out with Lechat) showed no anomalous patterns.

Water infrastructure: sixteen percent of Nelson's main distribution network had been replaced. The replacement program was ahead of schedule. Torres had reorganized the installation crew to use the

fabricator's output more efficiently, which had produced a thirty percent improvement in installation rate.

Community exchange program: eighteen Southern Reach students currently in the Vale Federation program, up from twelve at the Congreve visit. Fourteen Vale Federation faculty had visited Southern Reach communities for consultation sessions. The communications relay between Innsbruck and Nelson was operating daily. A joint research project on pre-war agricultural practices, proposed by a Vale Federation historian and a Southern Reach agricultural coordinator, had received community funding and was in its third month.

Security situation: Baxter had reorganized the Security Council structure. The weekly report to the aggregate fabricator output data was in place. Two Security Council staff had transitioned to the community communications network under Park's organization, where their skills in information analysis were applied to the community's external communication monitoring — tracking signals from communities that the Southern Reach was not yet in formal contact with, building the picture of the scattered population. Park had found this to be an effective repurposing.

Political situation: Vasquez had submitted her formal proposal for the Security Council's restructuring to the full council for a vote. The vote had been scheduled for the third week of the next month. Park's assessment was that it would pass with approximately seventy percent approval. Baxter had not opposed the proposal. He had, in Park's careful phrasing, "indicated that he found the proposal acceptable."

The report concluded:

The situation one year after the Congreve's departure is broadly positive. The material improvements are real and measurable. The political changes are proceeding more slowly but in the right

direction. The community is, in my assessment, in a better position than at any point since year two of the crisis — not because the crisis is over, but because the constraints that have been limiting recovery have been substantially addressed.

Mara Petrov is in Innsbruck. She is, from the messages I've exchanged with her, learning quickly and thinking about things I did not expect a seventeen-year-old to be thinking about. Her fabricator research paper was sent through the relay. The Chironian technical response was apparently positive. I don't fully understand the technical content, but I understand the response.

The fabricators keep running. That's the thing I want to say most clearly in this report. Every day, they keep running. People use them. The things they produce are in the community. The supply situation keeps improving. And the improvement is not dependent on the Congreve being here.

We did this ourselves.

Park

The Mountain State: Linh's Monthly Report, Month Seven

The format was Linh's invention — she sent a monthly report to the Congreve's comms relay, timed to arrive during the ship's regular communications window. She called it a monthly report because that was what it was, but its structure was more like a journal than a report: sequential, personal, analytical.

Month seven:

The third open community meeting happened last week. Chen had it in the main hall, which holds eight hundred people, because the

four-hundred-person meeting from month two made it clear that the interest was real. The hall was full.

The agenda: energy allocation reform. A working group had been studying the Mountain State's energy distribution system for six weeks. Their proposal involved three changes: a public energy usage dashboard (showing aggregate consumption by district, in real time), a community reserve allocation that goes to common spaces rather than being centrally held, and a pricing system for non-essential energy use that uses a token system rather than central rationing.

The token system is interesting. It's not money — the tokens are given equally to all community members each month and are specifically for non-essential energy consumption. Essential consumption — heating, food production, medical use — remains on the current system, which is allocation-based and meets every established need. The tokens are for things like recreational lighting, personal electronics, that category. The idea is that it allows personal preference to drive non-essential consumption rather than central allocation.

Chen sat through the full presentation of this proposal without expression. Afterward, he asked twelve questions. The questions were all good — they identified real uncertainties in the proposal, places where the working group had made assumptions that needed to be tested. The working group had answers to eight of them. Four they had to acknowledge as open questions.

He approved the proposal contingent on a ninety-day trial period, after which the community would vote on whether to make it permanent.

Ninety-day trial period with a community vote. That's not how Chen has made decisions for eleven years. That's how he's making decisions now.

I talked to him after the meeting. He was tired in a way he doesn't usually show. He said: 'The meeting is more work than deciding by myself. Every question I would have answered alone now gets answered in front of four hundred people. And some of those people have thought about the question longer than I have, and their answers are better.'

I said: 'That bothers you.'

He said: 'It used to bother me that I wasn't the smartest person in the room. Then I learned to run my decision processes as if I was the smartest person in the room, and the results were good, so I stopped being bothered. Now I'm learning that the process of aggregating many people's thinking produces better outcomes than my process, and that bothers me in a different way.'

I said: 'In what way?'

He said: 'In the way that learning you've been doing something suboptimally for eleven years is uncomfortable, even when the suboptimal version worked.'

I said: 'The suboptimal version kept six hundred thousand people alive.'

He was quiet for a while. Then he said: 'Yes. And the better version will keep them better alive.' He paused. 'I think that's the right thing. I'm still adjusting to it.'

—Linh

Chen and the Time

The thing nobody had expected — including Linh, who had been there for seven months and thought she understood Chen's patterns

— was that he read.

Not technical material. He had always read technical material. But in month eight, Linh noticed that the reading she sometimes heard from his office late at night was not the flat, precise cadence of technical analysis but the slower, more variable rhythm of narrative prose.

She mentioned it to him, directly, which was the only way to mention things to Chen.

“You’ve been reading fiction,” she said.

He looked at her without particular surprise. “Yes.”

“Since when?”

“Since month three,” he said. “The Schillinger archive had a complete library section. Pre-war literature, extensive coverage from multiple traditions.” He paused. “I hadn’t read fiction in thirty years. I stopped when the crisis started because the cognitive resources required seemed better applied elsewhere.”

“And now?”

“And now the cognitive resources required for the open governance process are different in character from the resources required for central management,” he said. “Managing alone required certain kinds of analysis — rapid decision-making, pattern recognition in operational data, risk calculation. The open governance process requires something different. It requires understanding how people think about problems. Understanding the narrative structures people use to give meaning to their experience.” He paused. “Fiction is, among other things, a record of how humans have thought about their experience over time. It’s useful.”

“Useful how, specifically?” Linh asked.

“The working group proposals come from people who have specific stories about their situation,” Chen said. “The stories shape the proposals in ways that aren’t always visible in the proposal itself. If I understand the story — the framework they’re using to think about the problem — I understand the proposal better than I would from reading the proposal alone.” He paused. “Last week’s proposal about the energy allocation — the token system — that came from a woman named Serena who grew up in a market economy. The token system is a market mechanism, adapted. Understanding that it came from a market framework helped me understand what it was trying to preserve from that framework and what it was trying to improve.”

“So you read fiction to understand people’s frameworks,” Linh said.

“I read fiction to understand the range of frameworks available to people who have grown up in the Earth tradition,” Chen said. “Which is broader than I’d remembered.” He looked at his desk, where the handscreen was showing a text she couldn’t read at this angle. “Your Chironian literature — does it exist?”

“We have a strong literary tradition,” Linh said, slightly surprised.

“Different from Earth’s?”

“Yes,” she said. “The concerns are different. A lot of Chironian fiction is about — questions of meaning and purpose in a context of abundance. The tension between individual expression and community responsibility when neither one is forced.” She paused. “There’s not very much about conflict in the sense of struggle for resources. That’s almost entirely absent.”

“Because the struggle doesn’t exist,” Chen said.

“Because the writers haven’t experienced it,” Linh said. “Or hadn’t, until recently.” She paused. “Some of the younger writers are beginning to write about Earth. About what we’ve found here. It’s going to be interesting to see what emerges.”

“Send me something,” Chen said. “Whatever you think is worth sending.”

She sent him three stories, each by a different young Chironian writer, each approaching the question of Earth from a different angle. The first was a story about the gap between what Earth’s survivors had known and what they could access, told through the metaphor of a library where the books are all present but some can only be read by people who understand the language they’re written in. The second was a story about a community that had survived by developing a very specific form of trust — trust in specific individuals, not in systems — and what happened when the specific individuals were no longer available. The third was about a child who grew up counting things and slowly learned to stop.

Chen read all three. His responses were brief and precise, in the way his responses always were.

On the first: *The library metaphor is exact. The knowledge exists. The access depends on the language.*

On the second: *The trust-in-persons versus trust-in-systems question is the question I’m living with. The story describes the problem better than I have managed to.*

On the third: *The counting child becomes what? The story doesn’t say.*

Linh replied: *The story says she starts writing poetry. Chen said: Is that adequate? Linh said: For the purpose of the story.*

He was quiet for a day. Then: *I don’t write poetry. I write governance proposals. Perhaps that’s the equivalent.*

Linh had written back: *I think it might be.*

Kath and the Question Alex Asked

The question Alex asked Kath, in year five of the return voyage, when he was sixteen and had been reading everything he could find about Chironian political philosophy, was not a question she had expected.

“Why don’t Chironians vote?” he asked.

She looked at him. “We do, on some things.”

“Not systematically,” he said. “Not as a primary decision-making mechanism. The Southern Reach votes. The Mountain State is starting to. The Vale Federation has a council that’s representative. But on Chiron—”

“On Chiron, decisions get made by the people who care about the specific decision and who are competent to make it,” Kath said. “There’s no mechanism for a person who knows nothing about water distribution to vote on water distribution policy.”

“But there’s a mechanism for a person who knows nothing about water distribution to vote on the entire council that makes water distribution policy,” Alex said. “Which is arguably worse.”

“Yes,” Kath said. “Democracy as practiced on Earth before the war had that problem. It made every citizen equally competent to choose leaders regardless of the choosers’ competence or the specific domain of the leadership.”

“So Chiron solved that by eliminating the voting mechanism,” Alex said. “And replacing it with—”

“Reputation and competence,” Kath said. “The people who manage a domain are the people who know the domain and who the community trusts to manage it, based on demonstrated competence. Not elected — accumulated.”

“And if you don’t trust them?”

“You stop working with them,” Kath said. “And their competence range narrows. And eventually they’re managing a smaller scope because their trust base has shrunk.”

“But what if they do something wrong and most people don’t notice?” Alex asked. “What if the competence is real but the application is wrong? Who corrects it?”

Kath was quiet for a moment. “The people who can see the wrongness,” she said. “And who care enough to say so.”

“Which is not guaranteed,” Alex said.

“No,” Kath said. “It’s not guaranteed.”

“On Earth, the voting mechanism was supposed to be the guarantee,” Alex said. “Even if individual voters were wrong, aggregate voting would correct errors over time.”

“The theory was better than the practice,” Kath said.

“The practice had problems,” Alex said. “But the voting mechanism was at least a specified mechanism. A designed check. Chiron’s equivalent is—”

“Social trust and reputation,” Kath said. “Yes. It’s less reliable than a designed mechanism in the short term and more reliable in the long term.”

“Why more reliable in the long term?”

“Because it depends on the actual relationships between actual people, rather than on a formal mechanism that can be manipulated,” Kath said. “Voting mechanisms can be gamed — you can manipulate information, you can buy votes, you can

gerrymander constituencies. Reputation can be gamed too, but it's harder to fake over a long period in a community where people know each other."

"And in a large community?" Alex said. "Where people don't know each other?"

Kath was quiet for a moment. "That's the constraint," she said. "The Chironian model works at the scale of a community where meaningful reputation can be maintained. At a very large scale—"

"It might need a voting mechanism," Alex said.

"Or something equivalent," Kath said. "Something that performs the error-correction function at scale."

"Like what?"

"I don't know," Kath said. This was not a deflection. It was accurate. "It's one of the open questions in Chironian political philosophy. The civilization has never been large enough to need to solve it. Eventually—" She paused. "Eventually the question is going to become practical."

"When Chiron's population grows," Alex said.

"Or when we're engaged with Earth at a scale that requires coordination mechanisms larger than what we've had," Kath said. "Either way." She looked at him. "Is this the question you've been building toward?"

"One of them," Alex said. "The other one is: what does the Southern Reach voting system need in order to work better than the pre-war version?"

"What are you thinking?"

“I’m thinking it needs two things,” Alex said. “First, information. Voters need accurate information about the specific decisions their representatives are making, in real time, not filtered through the representatives’ framing. The fabricator aggregate output data is one example — Baxter gets raw data about what’s being produced. What if citizens got that kind of data about governance decisions?”

“Radical transparency,” Kath said.

“Yes,” Alex said. “And second — a mechanism for competence-weighting. Not eliminating voting, but weighting votes based on demonstrated competence in the relevant domain.”

“That’s very old,” Kath said. “There are pre-war political theories that propose something similar.”

“I know,” Alex said. “None of them were implemented successfully. But none of them had the information infrastructure we have now. The fabricators can produce the information systems. The communication networks can distribute them.” He paused. “The Southern Reach has Park. She can build the information layer.”

Kath looked at her son for a long time. He was sixteen. He was working on the political architecture of a post-catastrophe civilization as if it were an engineering problem, which perhaps was not the wrong way to approach it.

“You’re planning to be on the second mission,” she said.

“If I can be,” he said.

“Why?” she asked.

“Because the question I’m working on is not theoretical,” he said. “The only way to test a theory about how a governance system should work is to try it in a real governance system.” He paused. “The

Southern Reach is going to be revising its governance in the next few years. If I can be there, with these ideas, and be useful—”

“The Southern Reach doesn’t need a seventeen-year-old Chironian to fix its governance,” Kath said. The tone was not dismissive — it was precise.

“The Southern Reach needs people who have thought about the questions longer and from a different angle,” Alex said. “Not to fix it. To offer tools. The same way the fabricators offer tools — not solutions, tools.”

“And if your tools are wrong?”

“Then the Southern Reach will use them, find out they’re wrong, and we’ll learn something,” Alex said. “That’s how tools work.”

Kath was quiet for a very long time.

“Talk to Lechat,” she said. “When the planning starts for the second mission.” A pause. “And write it down first. All of it. The theory, the mechanism, the implementation plan. Write it down before you talk to Lechat.”

“So he can evaluate it on paper before he has to respond to my face,” Alex said.

“So you can evaluate it yourself before you commit to it,” Kath said.

He looked at her. “Fair,” he said.

He went to write it down.

What the Children Inherited

The nine children who made the voyage to Earth and back came home to Chiron knowing things that no one else on Chiron knew.

Not the adults who had made the voyage — not the three hundred and fifty who had seen the same things the children had seen. They knew different things from the same experience, the way people always know different things from the same experience, shaped by the different angles from which they'd observed it.

The children knew what it was like to be a child on Earth. Not from the records, not from adult reports. From being children in the same rooms and on the same streets as Earth's children, and from the specific communication that happens between children who are genuinely trying to understand each other without the intermediation of adult social protocol.

Alex knew what it was like to sit with Mara at the river and understand her notebooks and feel the weight of her world in the specific way she carried it. He carried that knowing as specifically as he carried the stone.

Tomas knew what it was like to look at his cousins in Melbourne and recognize them as family and feel the gap between the family he'd expected and the people they'd become, and to love them anyway across the gap.

Saan knew what it was like to be a Chironian child in a world that had nothing in common with Chiron except the biological fact of humanity, and to find in that world things she valued that she hadn't expected to value.

The other children — the six who had made the voyage and returned, and the three who had been very small but had been there — carried their own specific knowings, different in content, similar in

character. Each of them carried a piece of Earth that was not in the files, not in Yuen's assessment, not in Bernard's technical report.

These pieces were not systematically useful in the way that the archive was useful or the fabricator efficiency improvement was useful. They were useful in the way that understanding is useful — diffusely, slowly, in all directions at once, in ways that are impossible to predict and impossible to prevent.

They came home and they talked to their friends and their families and their teachers, and the things they said were specific and real and not like the things the files said, and the specific-real-different-from-files things spread through the community the way most things spread on Chiron: through conversation, freely, to anyone who was interested.

Which was everyone.

Chiron Receives Them

The Congreve entered the Alpha Centauri system on a Tuesday, which was the day Jay Fallows ran his locomotive on the afternoon schedule.

The ship was visible from Franklin's surface — not with the naked eye, but with the kind of modest optical equipment that many Chironian households maintained. Jay's son Martin, who was four, looked through a telescope for the first time and saw a point of light moving against the star field.

“Is that the ship?” he asked.

“Yes,” Jay said.

“Is grandfather on it?”

“Yes.”

“And Alex?”

“Alex too.”

Martin looked through the telescope for a long time. Then he looked at his father. “What did they find?” he said.

“I’ll tell you when they’re home,” Jay said.

“Are they bringing things back?”

“Some things,” Jay said.

“What kinds of things?”

Jay thought about what he’d learned from the messages, from the communications during the last year, from the advance summary that Lechat had sent six months out. He thought about what the archive meant, and the efficiency paper with Mara’s name on it, and Linh in Colorado with Chen. He thought about Alex’s stone, which he’d heard about from Kath’s messages — the river stone, in his pocket for five years.

“Important things,” he said. “Mostly the kind you can’t see.”

Martin accepted this with the ease of a child who has learned that some answers are enough and some things come when they come.

The locomotive was scheduled to leave in twenty minutes. They went to get ready.

SUPPLEMENTARY CHAPTERS: THE VOYAGE AND ITS VOICES

Bernard's First Year

The first year of the voyage was, for Bernard Fallows, the best technical education of his life.

He said this to Colman at the end of year one, at the small gathering that marked the anniversary, and he said it with the specific conviction of someone who has considered several alternative framings and found this one the most accurate.

“How so?” Colman asked.

“The Chironian engineers on this ship,” Bernard said, “have a relationship to problems that I’ve been trying to achieve for forty years and haven’t fully managed.” He paused. “They don’t start from what they know. They start from what the problem requires. Which sounds simple. It isn’t.”

“What’s the difference in practice?”

“In practice, the difference is that when a Chironian engineer encounters a system failure, the first question is always: what does this system actually need to do? Not: how is this system supposed to work? The function first, then the mechanism.” He looked at his tea. “I was trained to start from the mechanism. The mechanism is what I know, what I was taught, what I’ve spent forty years learning to understand. Starting from the mechanism means that when something fails, I’m looking for the mechanical explanation.”

“And Chironian engineers?”

“Look for the functional explanation first. Why is the system not doing what it’s supposed to do? And then they trace backward from the function to the mechanism.” He paused. “The result is that they find failure modes I would have missed because the failure mode is in the function-to-mechanism link rather than in the mechanism itself.”

Colman thought about this. “Give me an example.”

“Month three,” Bernard said. “The secondary coolant variance that Alex spotted. I was going to check the pump mechanism — standard diagnosis. Linh looked at it and said: the function is heat exchange, the variance is in the rate of heat exchange, which could be pump mechanism but could also be fluid composition change. She checked fluid composition first.” He paused. “It was fluid composition. A microbial contamination that had altered the fluid’s thermal properties. The pump was fine. I would have spent two hours checking the pump and found nothing wrong, and then gone to the fluid as a secondary check.”

“How long did Linh take?”

“Eight minutes,” Bernard said. “She checked function, identified the functional failure mode, checked the most likely mechanism for that specific failure mode, found it.”

“That’s her training,” Colman said.

“That’s her formation,” Bernard said. “Not training exactly. The way she grew up thinking about problems. Chiron’s education system doesn’t separate the functional from the mechanical — every technical problem is presented in terms of what it’s supposed to accomplish and then how to get to that accomplishment. The mechanism is always in service of the function.”

“What does it feel like to learn that from the inside?” Colman asked.

Bernard thought about it. “Like recalibrating something I thought was already calibrated,” he said. “Not painful. Just — a persistent sense of adjustment. Every time I encounter a problem, there’s a moment now where I stop and ask myself: what is this supposed to do? And the answer sometimes changes what I look at first.” He paused. “It’s a good adjustment. I should have made it thirty years ago.”

“You can only make the adjustments the environment allows,” Colman said. “The environment you were trained in didn’t give you this one.”

“No,” Bernard said. “Which is why I’m grateful to be on a ship full of Chironian engineers at the age of fifty-two.” He smiled, which was not his most common expression. “Better late than not at all.”

The Library

On the ship there was a room on Level Three that was officially designated as the library and media archive. It had been stocked with the full Chironian digital library and several thousand physical books chosen by a committee that had the specific challenge of representing the full range of human literature in a selection small enough to physically carry across twelve light-years.

The committee had done this competently. The selection was eclectic, comprehensive in spirit if not in coverage, and had the interesting quality of a collection that had been chosen by people with very different reading histories and very different ideas of what was essential.

Colman used the library regularly but not in the way most people on the ship used it — not for reading in the conventional sense, not for

research, but for what he thought of as reconnaissance. He would come in, pick something at random, read for twenty minutes, and leave. Sometimes he came back. Sometimes he didn't. He had read this way his entire adult life and had found that it was the most efficient method for a person whose reading attention was intermittent to maintain any kind of relationship with literature.

In year four, he picked up a short novel by a pre-war Chironian writer — someone named Osei Mensah, who had written in the third generation after the Founders. The novel was about a man who returned to the neighborhood where he'd grown up on Chiron to find it had changed in ways that made his memories of it irrelevant.

He read the whole thing in one sitting, which was unusual for him.

The man in the novel was Colman's age — early forties, in the narrative. He had grown up in Franklin, left for a long-duration scientific survey of one of Chiron's distant continents, returned after twelve years to find Franklin extended and changed and full of people he didn't know and full of people he'd thought he knew but who had become different people in his absence.

The man spent most of the novel trying to decide whether to feel grief about this or curiosity about it, and eventually — not in a dramatic way, but in the specific quiet way that novels do things — decided that the grief was accurate but insufficient, and the curiosity was accurate and more useful.

Colman thought about this for a long time.

He was going back to Earth, which was not the same as going back to where he'd grown up. He had not grown up on Earth in any adult sense. He had been a child when the Mayflower II lifted, and the Earth he'd been a child on was twenty-five years gone even before the war. The war had accelerated the changes, catastrophically, but the changes had been happening before the war.

The Earth he was going back to was not the Earth of his childhood. The Earth of his childhood was gone — not destroyed, but superseded, evolved, the way the Franklin in Mensah’s novel had evolved beyond the memories of the man who’d left it. The right response was grief and curiosity, in that order. The grief was accurate but insufficient.

He returned the book to the shelf.

He went to the observation bay and looked at Sol for a while. It was just a star. It was also his origin. Both things were true simultaneously and neither one overrode the other.

Kath found him there. She sat with him without asking what he was thinking, which was one of the things she did that he had never found words for because the finding of words would have made it smaller than it was.

“Thank you,” he said.

“For what?”

“For being in this room,” he said.

She looked at him with the warm expression. “I was looking for you,” she said.

“I know,” he said.

Lechat in Command

The quality of Lechat’s command of the Congreve was, over six years, a specific thing that several people tried to articulate and that nobody fully managed.

Bernard said: “He commands from information, not from authority. He knows what he needs to know and he makes the decision and he explains it clearly and then he moves on.”

Kath said: “He’s learned the distinction between the moment for decision and the moment for discussion. The two moments require different behavior and he knows which one he’s in.”

Alex said, at age fourteen, when Colman asked him: “He doesn’t talk about himself. He talks about the problem.”

Colman’s own view was simpler: Lechat had learned, over the six-year voyage, that the thing you were certain about was usually less important than the thing you were uncertain about, and had organized his command around acknowledging the uncertainty and working within it rather than pretending to certainty he didn’t have.

The specific manifestation of this was visible in the command meetings. These happened every Monday, in the conference room off the bridge, with a standard agenda that Lechat revised slightly each week based on what had happened in the previous week. The agenda always included two items that were called “open questions,” which meant questions for which he did not have answers and for which he wanted the group’s thinking.

The open questions were never tactical. They were always the questions one level below the tactical: what does this decision tell us about our actual situation? What are we assuming that we might be wrong about?

In year three: “We’re assuming that Earth’s major political communities will respond to our presence similarly enough that we can use a single contact protocol. Is this assumption justified?”

In year four: “We’re assuming that the fabricators’ open-access design will produce better outcomes than managed distribution in

the Earth context. How confident are we in this, and what would change our mind?”

In year five: “We’re assuming that Chen Yi-jun is the most significant actor we’ll encounter at Earth. Should we reconsider whether this assumption is correct, and whether our preparation for other types of actors is sufficient?”

The group never fully answered the open questions. That was not the point. The point was to keep the questions open rather than closing them prematurely with comfortable answers. Premature closure was the thing Lechat had identified, in his private notes that he shared selectively, as the most dangerous failure mode of command in ambiguous situations.

His private notes were not private in the Terran sense — he did not guard them or conceal them. He kept them on the ship’s open file system, accessible to anyone who looked for them. Most people didn’t look. The people who did look were the same people who brought the best questions to the Monday meetings.

Alex, at fifteen, read Lechat’s notes and came to two Monday meetings in a row with questions that Lechat subsequently adopted as open questions, which was a form of recognition that he offered without comment, since comment would have been condescending.

The Chironian Question

In year five of the return voyage, the Chironian passengers organized a series of discussions that they called, simply, “the conversations,” which was typical Chironian naming — direct, specific, unfussy.

The conversations were about what the voyage had changed in their understanding of Chiron.

It was not a community meeting in any formal sense. People came and went. The discussions moved from specific observations to general principles and back again, in the way Chironian discussions tended to move — not by an agenda but by the logic of the ideas themselves.

Colman attended three sessions and listened.

In the first, a Chironian woman named Fala who had come on the voyage to do ecological survey work, said: “The thing I keep coming back to is that we built Chiron on the assumption that the material problem was the fundamental one. Solve the material problem — scarcity — and the rest follows. And it did follow, for us. But Earth’s survivors solved the material problem by a different route — not by eliminating scarcity but by managing it — and what followed was different.”

“Different how?” Drel asked.

“They built tighter community,” Fala said. “The scarcity created dependencies that created bonds. Vasquez told me that the bonds that formed in year one — when the Southern Reach was deciding whether to help the Melbourne community or prioritize its own population — those bonds were stronger than any bond she’d experienced before the war. The shared crisis created a kind of trust that doesn’t come from abundance.”

“And that’s valuable,” another Chironian said.

“It’s real,” Fala said carefully. “I don’t know if it’s more valuable than what we have. It’s different. We have trust built on choice and demonstrated competence. They have trust built on shared survival.” She paused. “I wonder if we’ve lost something by not having had the crisis.”

“We weren’t designed to have the crisis,” Juren said. “The embryo program was specifically about removing the crisis.”

“Yes,” Fala said. “And what we found was a civilization that had survived a crisis and come through it with something specific that we don’t have. The question is whether we want it, and whether we can get it without the crisis.”

“You can’t engineer hardship,” someone said.

“No,” Fala said. “But you can cultivate the specific qualities that come from hardship — the tight trust, the precise attention, the knowledge of exactly what you have and what you don’t — without requiring the hardship itself.” She paused. “Mara Petrov had all of those qualities, at eleven years old, not because the hardship was good for her but because it produced something specific in her character that would have been harder to produce otherwise.”

“And the fabricator will give her children those qualities without the hardship,” Drel said.

“That’s the hope,” Fala said. “I’m not sure it’s guaranteed.”

The second session was more focused on a specific question that had emerged from the first: was the Chironian model exportable, or was it specific to its conditions?

Rashida, who attended Chironian discussions with the specific interest of a former Terran who found Chironian self-examination more rigorous than most external criticisms, said: “The conditions that produced Chiron were: blank slate, abundant resources, good initial design. The conditions on Earth are: conditioned population, newly abundant resources, varied existing designs. The question of exportability depends on whether ‘conditioned population’ can unlearn enough to access the blank slate.”

“It’s not a question of blank slate,” Kath said. “The Chironian model doesn’t require a blank slate. It requires different conditions. The blank slate happened to be how we got the conditions, but the conditions themselves are what matter.”

“What conditions specifically?”

“No coercive authority,” Kath said. “Abundant resources that make coercion unnecessary. A community small enough that reputation is meaningful. And — this is the one people underestimate — enough time. The Chironian model didn’t emerge immediately. The Founders made it deliberately. The generation after them lived it partially. Our generation grew up in it.” She paused. “It took three generations to become self-sustaining. Earth doesn’t have three generations to work with.”

“Unless we give them three generations,” someone said.

“The fabricators are three generations,” Kath said. “Not in the sense that the transformation happens in three generations — it might, it might not. But in the sense that the fabricators change the material conditions durably enough that three generations from now, the people who grew up with them will have grown up in conditions that are much more similar to the Chironian conditions than to the pre-war Earth conditions.”

“And then the model follows,” Fala said.

“And then something follows,” Kath said. “I wouldn’t predict what.”

The Observation Deck: Years Out

There was a tradition on the Congreve, informal and unannounced, that on the evening of each year’s departure anniversary, the observation deck was where people gathered. Not everyone — the ship had enough social life that not every tradition required universal participation. But a core of people who had started gathering there in year one had continued gathering, and the gathering had accumulated its own character.

In year six of the departure, the last full year of the return voyage, the gathering was the largest it had been. People had the sense of approaching something — not physically, since they were still months away — but temporally. The last anniversary before home. The last time this particular gathering would happen in deep space rather than in the Alpha Centauri system.

The observation deck was full without being crowded, which was a quality of a good room — capable of holding more than expected without feeling pressured. The star field showed both stars: Alpha Centauri brighter ahead, Sol brighter behind. The planet between.

Colman stood at the edge of the group with his back to the stars, watching the people.

He had done this on Earth — stood at the edge of groups and watched. It was his default information-gathering posture: observe the group rather than participating in it, look for the structures and dynamics that weren't visible from inside the group.

What he saw was: a group that had been together for six years and was returning home and had been changed by the journey in ways that were visible and ways that weren't.

The visible changes: the children were older. Alex was seventeen — tall, with the focused attention that had always been his distinctive quality, now combined with something harder to name. Experience, probably. Tomas was quieter than he'd been at the beginning, with the specific quietness of someone who had processed something large and was living with the weight of it. Saan was more certain, in the way of people who have found that their values hold under pressure.

The less visible changes were in the adults. Bernard moved through the engineering section differently — with more of the functional-first orientation he'd described in year one. Rashida had lost the specific anxious quality that had characterized her discussions in

year one; she had replaced it with something more settled, the quality of someone who has found that her most important question — is the Chironian model exportable? — has a more interesting answer than she'd expected. Lechat had the specific quality of a commander who has completed a mission successfully enough to be proud of it and honestly enough to know where it fell short.

And Kath. Kath was the person Colman watched last and the person who was hardest to read, not because she was opaque but because she was comprehensive. She carried the most complete picture of what had happened and what it meant, and she held it with the characteristic Chironian quality of not performing it, not displaying it, just living in it with the completeness.

He went to stand with her.

“What are you thinking about?” he asked.

She looked at the stars. “Mara,” she said. “I keep thinking about Mara.”

“Yes,” he said.

“Specifically about the moment when she told Alex she'd been reporting on him,” Kath said. “And he said: ‘I know. We figured it out the first week.’”

“He told me about that,” Colman said.

“What he told you,” Kath said, “is the Alex version, which is probably accurate. What I've been thinking about is the Mara version. What it felt like for her to say that. To confess it. And then to have Alex say: ‘I know. And I talked to you anyway.’”

“She expected hurt,” Colman said.

“She expected to lose the friendship,” Kath said. “That’s what you expect when you confess to having violated trust. And Alex gave her — not forgiveness exactly, because there was nothing to forgive. He gave her the information that the friendship had not depended on the trust she thought she’d violated.” She paused. “Because the Chironian relationship to information is different. Alex wasn’t hurt that she was reporting on him because reporting accurate information to people who could use it productively is — not a violation. It’s a function of good citizenship.”

“From the Chironian perspective,” Colman said.

“From the Chironian perspective, yes,” Kath said. “For Mara, it was a violation because she understood it as betrayal. Alex understood it as information sharing. And when he told her that he’d always known and had continued talking to her because she was worth talking to — that was the information she needed to recategorize the experience.”

“She recategorized it from betrayal to—”

“Honesty,” Kath said. “She was doing the honest thing in a context where honesty looked like betrayal from inside but didn’t look like betrayal from outside.” She paused. “That recategorization is a significant thing. Because it’s not just about that specific incident. It’s about the whole way she understands the relationship between loyalty and honesty.”

“Loyalty to her community required reporting,” Colman said.

“And honesty to Alex required telling him she’d been reporting,” Kath said. “In the pre-existing framework, those two things were in tension — one was betrayal of him, the other was betrayal of her community. In the framework Alex gave her, they weren’t in tension at all. Reporting accurate information is fine. Telling him she’d been doing it is fine. The tension was in her model, not in the situation.”

“And the model changed,” Colman said.

“A piece of it,” Kath said. “A piece of it changed.”

“Is that enough?” he asked.

“It’s a piece,” she said. “Pieces accumulate.”

What Lechat Wrote

In year six of the return voyage, with three months to go before arrival at Alpha Centauri, Lechat wrote a document that he titled “Notes on the Mission” and that he added to the ship’s open archive.

It was not the official mission report — that was Yuen’s document, comprehensive and analytical. Lechat’s notes were something different: a personal account of what he’d understood and what he’d failed to understand and what the difference had cost.

He shared it first with Colman, which was his way of testing whether it was ready.

Colman read it in the observation deck over two hours.

The document had five sections.

The first section was about what he’d expected to find on Earth and what he’d found. The expected: a recovering civilization at low levels of organization, responsive to assistance, grateful for the technology, relatively straightforward in its political dynamics. The actual: a civilization that had developed — in eleven years of intense selection pressure — a set of political structures and leadership figures of unusual sophistication, whose adaptation to Chironian-model assistance was more complicated and more interesting than the expected scenario had allowed for.

The second section was about Baxter. Lechat had spent more time thinking about Baxter than about Chen, which surprised him and which he was honest about. “Baxter is a better model of what the second mission will encounter than Chen,” he wrote, “because Baxter is ordinary in the way that Chen is extraordinary. Most of the people who have built themselves into positions of authority in the surviving communities will be more like Baxter than like Chen — competent, well-intentioned, working within frameworks that were correct for their conditions, resistant to changes that undermine the frameworks without understanding that the frameworks have outlasted their conditions.”

The third section was about equal distribution. He had believed in it. He still believed in it. But he was now more precise about what it meant and what it didn't mean. “Equal distribution does not mean identical distribution,” he wrote. “It means that no community receives preferential access based on its relationship with the Congreve. What communities receive based on their specific needs and the specific capabilities they bring to the collaboration — that's not preference, that's information. The Vale Federation's knowledge tradition is a specific resource that the Southern Reach's agricultural capacity is not. Connecting them produces something neither had alone. That's not a violation of the equal distribution principle.”

The fourth section was about Chen. It was shorter than the section on Baxter. “Chen Yi-jun is the hardest problem I've encountered in a career of hard problems,” Lechat wrote. “Not because he's resistant or hostile or irrational. Because he's done something that I would have had to make decisions very similar to his decisions to have done, and I cannot be certain that my decisions would have been better.” He paused in the writing, and the pause was visible in the way the prose style changed. “He kept six hundred thousand people alive by making choices I cannot endorse and cannot condemn. The conversation I had with him in Fort Collins did not resolve this. I don't think it was supposed to.”

The fifth section was about Alex, which Colman had not expected.

“The most important member of the mission,” Lechat wrote, “was a ten-year-old boy who asked the questions that the adults had agreed not to ask. Alex Colman’s questions — about Terran history, about the logic of Chironian principles, about what Earth needed as opposed to what Earth’s governments wanted — were not always comfortable, and they were never naive, and they consistently identified the distinction between what we were doing and why we were doing it in ways that adults trained to conflate those two things could not always manage.” He paused. “He asked Pak, in year three, whether anyone on the Mayflower II had known a war was coming. That question had not been asked in a group setting, by anyone, in the previous three years of the voyage. The answer to it was consequential for how the adults on the ship understood their relationship to Earth’s catastrophe. A ten-year-old asked it because he had not learned not to.”

The document ended: “The second mission should include children. Old enough to have formed the questions they’ll ask, young enough to not have formed the prohibitions against asking them. If Alex Colman can be on the second mission, the second mission will be better for it.”

Colman read this section twice.

He went to find Alex.

Alex was in the signal analysis room, which was where he often was in the evenings, watching the Alpha Centauri system resolve into familiar detail through the long-range instruments. He looked up when Colman came in.

“Lechat wrote about you,” Colman said.

“I know,” Alex said. “He told me he was going to.”

“And?”

“And I told him the second mission should include Mara,” Alex said. “If she wants to come. When she’s ready.”

“What did he say?”

“He said he’d think about it.” Alex turned back to the instruments. “He also said that if I came on the second mission I should bring the notebook.”

“Which notebook?”

Alex patted his pocket — the pocket where the stone was. “Both of them,” he said. “The stone and the notebook. Both kinds of specific things.”

“That’s smart,” Colman said.

“It’s Lechat being thoughtful,” Alex said. “He knows the difference between what’s portable and what isn’t.”

Colman looked at the Alpha Centauri system in the instruments. Their system. Getting closer every day.

“Are you ready to go home?” he asked.

Alex considered the question with the seriousness it deserved. “Yes,” he said. “And no. Both.” He paused. “Home is going to feel very — clean. After Earth. Very orderly and well-supplied and calm.” He paused again. “I’m going to want to go back to Earth. I know that already.”

“Second mission,” Colman said.

“Or before,” Alex said.

“What do you mean?”

“Mara’s messages come through Park’s relay,” Alex said. “The relay has a response window of about forty-eight hours with the current orbital positioning. I’ve been writing back.” He looked at his father. “Is that okay?”

Colman was quiet for a moment. “I didn’t know you were doing that.”

“You didn’t ask,” Alex said.

This was fair. Colman had the specific parental experience of realizing that his son had been doing something important and self-directed that he hadn’t known about, and the specific recalibration required was the recalibration from ‘my child’ to ‘a person who has an independent relationship with the world.’

“What do you talk about?” he asked.

“The fabricator efficiency paper,” Alex said. “She explained the analysis and I worked through it with her. We disagree on one part of it — the assumption about feedstock homogeneity. I think she’s right and the published version will need a correction.” He paused. “And we talk about what she’s learning in Innsbruck. And what I’m thinking about for the second mission.” He paused again. “She’s thinking about coming to Chiron. Not as a visit. Possibly to study there.”

“When?”

“In a few years. After she finishes the Vale Federation program.” He looked at the instruments. “She wants to study with the Chironian materials science group that responded to her paper. They’ve been corresponding through the relay.”

Colman was quiet.

“She’s sixteen,” he said.

“I know,” Alex said. “It’ll be a few years.” A pause. “She’s going to be very good at this.”

“At what?”

“At the questions,” Alex said. “At asking the specific useful questions. At writing down what she sees.” He paused. “She’s going to be one of the people who builds the thing on Earth that makes it worth visiting again.”

“That’s a large prediction,” Colman said.

“She’s already started,” Alex said. “The fabricator efficiency paper is the first entry in a notebook she hasn’t written yet. She’s going to fill it.”

He turned back to the instruments. Alpha Centauri was very close now, in the relative sense of interstellar space. The system was resolving into its components: the primary star, the secondary, the planets in their orbits, and Chiron — green-blue and specific and real.

Home.

And also not the whole picture anymore.

Both at once, in the way that things are when you’ve been somewhere that changes the meaning of the place you started.

Colman stood with his son in the signal analysis room and watched their home planet get larger in the instruments, and thought that this — the specific quality of this moment, with this person, watching this thing — was not in any of the files and was not in any report and would not be in any future mission briefing.

It would be in the stone in Alex’s pocket, and in the notebooks he kept, and in the things he said to Mara through the relay, and in the

things she said back, and in what she made with the fabricator, and in what she taught the person she taught, and in what that person taught the next.

Seeds. Not plantings. Seeds.

The ones that go where the wind takes them.

Home

They arrived at Chiron on a Tuesday.

Not because Tuesday was significant or because the timing was planned for it. The arrival calculation had been run months in advance and had produced Tuesday as the result of the physics of the trajectory, which had no opinion about days of the week.

Chiron from orbit was the specific blue-green that was both like and unlike Earth's blue. The atmosphere was similar in composition but not identical; the albedo was slightly different; the clouds had a quality that Colman had stopped being able to describe because he'd been looking at it for eleven years and then looking at Earth's clouds and now looking at it again, and the comparison had made the description more complicated rather than simpler.

They came into orbit at dawn on the eastern coast, which put Franklin in view as the ship crossed the terminator — the great city lit in early morning gold from one direction and softened into shadow from the other, with Jay's railroad visible as a thin thread running south from the central district and the steam locomotive on the morning run trailing its white plume.

Alex watched from the observation deck.

He had the stone in one hand and his handscreen in the other, composing a message to Mara that he'd been working on for the last three days:

Arriving Chiron Tuesday. Franklin looks like—

He paused. He thought about how to describe Franklin from orbit to someone who had never been in orbit and who lived in a city that was rebuilding itself rather than a city that had always been abundant.

He wrote:

Franklin looks like a city that doesn't know it's doing anything remarkable. Everything works. The lights are on everywhere. Jay's steam locomotive is running on schedule. The university buildings are lit up at dawn. Nobody's counting anything.

I thought about you the whole descent. Not because it made me sad. Because the specific thing you've made me understand — the difference between counting and not counting — is the most important thing I'm bringing home.

The stone is in my pocket. I've had it for six years and eight months. I'm going to put it on my desk when I get to my room. I'll send you a photo.

Tell me what you're making next.

He sent the message through the relay. The response time was about thirty-six hours now, with the orbital geometry. He would read her response in thirty-six hours.

He put the handscreen away. He held the stone.

The shuttle was boarding in twenty minutes. He would be on Chiron's surface in three hours. He would see Jay and his locomotive

and Martin and the university and the coast and the fabrication center and all the specific things that constituted home.

And in a few hours, when the immediate things had been attended to and the reunion was done and the unpacking was complete, he would sit down and begin writing. Not the analysis for Lechat — that could wait. Not the technical notes on the mission — Bernard had those covered.

He would write what he understood. What the mission had given him that was his specifically and that he hadn't had before.

He would write about Mara at the river. About the supply numbers and the specific weight of the stone. About the water allocation and the clinic and the fabricators running in Nelson and what it felt like to watch Chen stand in front of four hundred people and accept a proposal that wasn't his.

He would write it down so that future-Alex would have it, and so that the people who came after would have it, and so that eventually, maybe, Mara would read it and recognize herself in it and know that what she'd shown him was specific and real and carried forward.

Seeds.

He pocketed the stone. He went to board the shuttle.

Home was below.

Earth was behind.

And between them, in the twelve light-years of deep space that both of them occupied and neither of them fully owned, a set of seeds was growing.

Whether anyone would see them come up, or whether they would come up in the dark and be found later, fully grown, by someone who

had not planted them — that was not the question.

The question was: are the seeds in?

They were.

THE END

“When you have done what needed to be done, and you cannot tell if it worked — that is when the patience begins. The patience is not waiting. The patience is continuing to do the work while the seeds decide.” — Kath, from her personal journal, year six of the return voyage, date uncertain

THE VALE FEDERATION AND FINAL SCENES

Innsbruck

The shuttle from Nelson to Innsbruck took eleven hours, which was not the shuttle's limitation but the Southern Reach communications network's scheduling requirement — the flight path crossed several atmospheric weather systems that needed to be navigated rather than overflown, and the navigator preferred the conservative route.

Colman spent the eleven hours looking at the ground.

He had seen Earth from orbit — the orbital survey had been thorough and the instruments had been good. But the orbital view was the view of a geographer: landmass and water, vegetation coverage, settlement patterns, the geometric marks of human presence. The ground view was different. The ground view was specific.

He saw the Mediterranean from the air as they crossed southern France — blue and specific, the particular shade that existed nowhere else in his experience, bounded by the tan of the northern shore and the brown of the Saharan coast. He saw the Alps from above: great white walls of rock and snow, which from orbit had been terrain and from altitude were — sublime was the word, which was a word he didn't usually apply to things, but which here was accurate.

“They're bigger than I expected,” said Tomas, who was next to him.

“Everything is bigger from the air than from orbit,” Colman said.

“No,” Tomas said. “I mean bigger than the files. The photographs don’t get it right.” He was looking at the mountains with the specific attention of someone revising a model. “The photographs are accurate. But there’s something in the actual size that the scale bar doesn’t communicate.”

“The scale bar communicates the number,” Colman said. “The actual experience communicates what the number means.”

Tomas nodded slowly. “Yes,” he said. “That.”

Innsbruck was a bowl of a city, cupped by mountains on three sides, with the Inn river running through it in the specific blue-green of meltwater. It had been a mid-sized city before the war — a university city, a tourist city, a city that was used to hosting people who came from elsewhere and who needed to be accommodated. The accommodation infrastructure had proved useful in the crisis: the hotels had become housing, the university had become a coordination center, the tourist infrastructure that had handled people’s movement in and out of the city had been repurposed for the movement of people and resources between the mountain communities.

The university itself was at the foot of the mountain to the north, in a cluster of buildings that had been built over several centuries and that had the specific architectural texture of European institutional architecture — solid, confident, designed to suggest that what happened inside was important and would continue to be important for a long time.

The buildings had survived the war without direct damage. The people inside them had been fewer, in the years after — faculty who had stayed, students who had come despite everything, the specific subset of a community that gravitates toward learning as a response to catastrophe because learning is how they make sense of things.

Professor Schafer was waiting outside the main entrance, which was not because she needed to greet them specifically — there were other people assigned to logistics — but because she wanted to be the first person from the Vale Federation they saw, and she wanted the first impression they got to be her rather than a protocol officer.

This was, Colman thought, very correct instinct.

She led them through the university's main corridor, which had the smell of old buildings everywhere — stone and wood polish and the underlayer of something that was probably books in an adjacent room. She explained as she walked, with the specific ease of someone who knows a space well enough to describe it without looking at it.

“The physics and chemistry departments are on the first floor,” she said. “We moved them there in year two because the ground floor flooding risk was lower than the upper floors and the equipment is harder to replace than the people.” A pause. “The literature and history departments are on the fourth floor. They have better light. The people who work there are better compensated by light than by flood safety.”

“How many faculty?” Lechat asked.

“Permanent faculty: thirty-one. Visiting or adjunct, who contribute specific expertise on a part-time basis from the communities: another forty-four. Students currently enrolled: two hundred and eleven.” She paused. “Of those two hundred and eleven, six are from the Southern Reach — the first cohort of your exchange program. They arrived two weeks ago.”

“How are they settling in?” Colman asked.

“Very well,” Schafer said. “They're more prepared than I expected and less prepared than they thought.” She smiled. “Which is the correct condition for a student.”

“What do you mean?”

“They’re technically capable — all of them have strong foundations in the engineering and science areas. But the mode of learning here is different from what they’re used to. We don’t teach by telling. We teach by questioning.” She paused. “In Nelson, the teaching was — I’m told — very application-focused. You learn what you need for the specific task at hand. Here, we teach the principles behind the applications, which requires the students to learn to think in a different mode.”

“And they’re managing it?”

“One of them — a young man named Dario — came to see me in week two and said he felt like he didn’t know anything.” Schafer’s expression carried appreciation. “I told him that was the correct state for someone who has spent their entire education learning how to do things and is now beginning to learn why. He was not immediately comforted by this.”

“Was he eventually?”

“I’ll tell you in six months,” she said. “The appropriate response to that stage of learning is patience, which is a quality students develop on a curve.” She opened a door into a seminar room. “Come in. I’ll show you what we’re working on.”

The seminar room had twelve people in it — faculty and senior students, gathered around a large table covered in documents and handscreens. They looked up when the door opened. There was a quality in the looking-up that Colman recognized: the quality of people who have been working on something absorbing and have surfaced briefly to acknowledge a new presence before returning to the work.

Schafer introduced the Congreve team briefly. There were nods, a few words, an invitation to sit. Then the room returned to what it had

been doing.

What it had been doing was arguing about pre-war physics.

Specifically, arguing about an interpretation of a mathematical framework that had been developed in the 2030s and that had been applied, in the last years before the war, to a set of materials science problems. One of the graduate students — a woman named Elena, who was twenty-three and had the specific combative certainty of someone who knows she's right about a technical point and is waiting for everyone else to catch up — had found an error in the original framework's application. The error was minor but it propagated through twenty years of subsequent work in a way that had produced subtly incorrect results in the materials literature.

The argument was about whether the error was important.

"It's three percent," the other student said. "In the context of the material properties being studied, three percent is within the normal variance."

"Three percent in the framework means approximately three percent in all subsequent applications that use the framework," Elena said. "The subsequent applications include twelve published studies, four of which are in use in current engineering practice."

"In which fields?"

"Structural composites," Elena said. "Specifically the bonding chemistry for load-bearing applications. The error is conservative — it predicts slightly lower yield strength than the actual, which means the safety margins built on the predictions are more generous than necessary."

"More generous than necessary is fine."

“More generous than necessary means heavier structures than required,” Elena said. “In an environment where material efficiency matters, heavier structures than required are not fine.”

Bernard, who had been listening with the absorbed attention he gave to good technical arguments, said: “May I?” He was looking at the handscreen on the table.

Elena slid it toward him. He looked at the calculation. He looked at the original framework documentation on a second screen. He read for three minutes in complete silence.

“The error is in the third term of the coupling equation,” he said. “It’s a sign error that propagated because the original authors used a non-standard sign convention that wasn’t documented.” He looked at Elena. “Your identification of the error is correct. Your propagation analysis is correct. The practical consequences for current applications are as you’ve described.” He paused. “And the correction is straightforward — it’s a global sign flip in the coupling term. Every application that uses the framework needs to be rechecked against the corrected version.”

Elena looked at him with the expression of someone who has been right about something important and has just had it confirmed by someone with more standing than the people who have been disputing her. “Yes,” she said. “That’s what I’ve been saying.”

“Then you’re right,” Bernard said. “Documenting the correction and its consequences is important work. Do you want help writing it up?”

Elena looked at him — assessing, in the way that good students assess new contributors. “Are you the engineering chief from the Congreve?”

“Yes,” Bernard said.

“Then yes,” she said. “I’d like your input on the implications for the composite bonding applications specifically.”

Bernard sat down. The meeting reorganized around the new contribution. Schafer, watching from the edge of the room, had a specific expression — the expression of someone who has found exactly what they were looking for and is pleased that it came in the form they’d hoped for, which was not a lecture from visiting experts but a working collaboration.

“This,” she said quietly, to Lechat, who was standing beside her, “is why I wanted the exchange program.”

“Yes,” Lechat said.

“Not the resources we can provide them,” she said. “The specific technical intelligence, on both sides, that only comes from people working together on real problems.” She paused. “Elena has been trying to get people to take that error seriously for three months. Bernard validated it in four minutes.”

“His four minutes depended on her three months,” Lechat said.

“Exactly,” Schafer said. “The four minutes wouldn’t have been possible without the three months. The three months needed the four minutes to matter.” She looked at the table, where Bernard and Elena were now deep in a shared discussion of the correction methodology. “That’s what a knowledge tradition is. Not the accumulated knowledge. The accumulated practice of building knowledge together.”

What Innsbruck Preserved

The afternoon in Innsbruck was spent in the library.

Not a digital library — or not primarily. The Vale Federation’s university library had a physical collection that was extraordinary in the context of post-war Earth: twenty thousand physical volumes, preserved through the crisis years with the specific dedication of people who understood that some things are worth carrying even when everything is heavy.

The librarian was a man named Otto — a different Otto from the Founder, younger, who had grown up in the Alps community and who had made the library his life’s work with the specific conviction of someone who has decided that the things they care for are the most important things.

“We lost approximately four thousand volumes in the flooding of year two,” he told Kath, as he walked her through the stacks. “We recovered three hundred and twelve of them with restoration work. The others were beyond salvage.” He paused. “The ones we lost were primarily in the mathematics and physical sciences sections. Which is why the digital backups of those sections are more complete than the humanities sections — we prioritized the digital preservation of what we lost physically.”

“You have the humanities in physical form,” Kath said.

“The humanities in physical form,” he said, with the specific quality of a person who loves what he does and knows it. “The sciences in digital form, which is more reliable for the specific type of access scientists require — searching, cross-referencing, updates. The humanities in physical form, which is more reliable for the specific type of access that humanities require.” He paused. “Which is reading. Actually reading, in sequence, in the way the author intended.”

He led her to a section that had a different quality from the rest of the library — less organized, more heavily used, with the specific

worn-spine quality of books that have been opened and reopened many times.

“The fiction section,” he said. “The most heavily used part of the library.”

“In a university library,” Kath said.

“In a post-war university library,” he said. “When the material conditions are very constrained, the internal world becomes correspondingly important. People read fiction here the way people exercise — because it’s necessary for a kind of health that isn’t material.” He paused. “The students who come here are studying engineering and medicine and physics and agricultural science. They need the fiction the way they need the physical exercise the university requires of them. It’s not a luxury. It’s maintenance.”

Kath looked at the spines. She pulled out a volume — a novel she recognized, pre-war, a story about a scientist who had made a significant discovery and who spent the novel trying to decide whether to publish it or protect it.

“We have this on Chiron,” she said.

“Yes,” Otto said. “We have everything that survives on Chiron in digital form. The physical copy is different.”

“Why?” she asked.

He thought about it. “The physical copy has a history,” he said. “This specific copy was read by twenty-seven people before the war. We know this because the checkout records survived in a filing cabinet that was sealed when the digital records systems failed in year one. Twenty-seven people read this book between 2030 and 2041.” He paused. “Some of them underlined things. Not all the same things — different passages. The things that mattered to different readers at

different times.” He opened the book to a random page and showed her: a sentence underlined in pencil, faded, from a careful hand.

You can't hold the truth in your hand. You can only hold your understanding of it, and understanding changes.

“Who wrote that?” she asked.

“One of the twenty-seven readers,” he said. “We don’t know which one.” He closed the book. “The physical copy is a record of the readers as much as the text. Every mark, every underline, every worn page. The digital copy is just the text.”

Kath held the book.

“I want to take this back to Chiron,” she said. “Not the physical copy — I understand why it needs to stay here. I want to take the idea of it. The idea that the reading accumulates, that the book carries the readers.”

“You can take the digital copy,” Otto said. “And you can take the record of the readers — the checkout log, the annotation catalogue.” He paused. “We’ve been cataloguing the annotations for three years. Elena’s project, before she got interested in the materials science framework. Every underlined sentence, noted, with the approximate date range of the reader based on the ink and pencil types available in different periods.”

“You have a record of what mattered to people across thirty years of reading,” Kath said.

“Across thirty years of reading in this specific library, yes,” Otto said. “It’s not complete — not every reader marked anything, and some marks are illegible. But it’s substantial.” He looked at the shelf. “The humanities are always about this. About what mattered to people and when and why. The physical record is more specific than the digital one.”

“We’ll take everything,” Kath said. “The digital copies, the annotation catalogues, the checkout records. Everything.”

“I was hoping you’d say that,” Otto said.

Colman’s Letter

On the last night in Innsbruck, Colman sat at the writing table in the accommodation the Vale Federation had provided and wrote a letter.

He did not write letters often. He communicated in person, through handscreens, through the ship’s relay systems. The specific ritual of a letter — addressed to a specific person, in a form that was more composed than a message — was not his default mode.

But the night in Innsbruck had a quality that called for it.

The letter was to Sirocco.

He wrote:

Sirocco.

We’re in Innsbruck for two days. We’ve been on Earth for sixty-four days. This is the second night I’ve had enough quiet to write rather than to think or to talk, and I find I want to tell you what I’ve found rather than save it for when I get back.

Earth is alive. That’s the first thing. I didn’t know how certain I was that it wouldn’t be until we came close enough to see it and I understood that I’d been protecting myself from the expectation of absolute loss. The southern hemisphere is green. There are communities that have been governing themselves with honesty and competence for eleven years. There are specific people doing

specific things for specific reasons, and some of the things are remarkable.

Vasquez. You would have liked Vasquez. She has your quality of saying the direct thing without decoration, and the additional quality of having had the hardest eleven years you can imagine and coming through it with both her honesty and her competence intact. She asked me, on the first day, what we needed in return for the medical supplies. I said nothing. She said she didn't believe me. I said I understood.

Chen Yi-jun. I don't know what you'd make of Chen. He's what happens when the smartest person in the crisis takes full responsibility for the response and makes it work and comes through on the other side knowing exactly what the method cost and exactly why it was necessary and unable to say whether another method would have been better. Lechat spent four hours with him and came back — not shaken, not convinced, but changed in some way that I'm still working out. I was in the room with him twice and left both times thinking that the framework I had for understanding people who do very difficult things very well was inadequate.

The children from the ship are doing something I should have anticipated and didn't. They're doing the thing I was told D Company used to do, which you told me was 'find the angle nobody else is looking from.' Alex found Mara. Tomas found his cousins. Saan found the mountains. Each of them brought back something specific that the adults weren't positioned to find, because adults have too many categories and not enough blank spaces.

I'm going to ask you something when I get back. I'm going to ask you whether D Company had the best time of your lives and whether you knew it while it was happening or only in retrospect. Because I think I'm having the best time of my working life right

now, and I'm aware of it while it's happening, which is unusual and which I think is worth noting while I can.

It won't be long. Arrival in eleven months if the schedule holds.

Colman.

He read it once. Then he sent it through the relay.

Sirocco's response, when it came thirty-one hours later, was three lines:

The best time, yes. Knew it while it was happening, yes. How did you know to ask?

Tell me about the children when you're home.

Sirocco.

Year Four, Night Watch

The night watch on the Congreve was a rotation — two hours per person, twice per week, the specific discipline of making sure that someone was always paying attention to the ship's systems during the hours when everyone else was sleeping.

Colman did his night watches at 0200. He had done this since year one, not because 0200 was his assigned time but because it was the hour that suited him — the deep quiet of the ship when even the Chironians, who had less trouble with sleep than the former Terrans, were mostly at rest.

On a Wednesday in year four — midway through the voyage's second half, deep in the empty between stars — he was on night watch when Linh came into the monitoring room.

She had come from the library. She was carrying a physical book — one of the ship's collection, a history of the pre-war period that she had apparently been working through in stages. She sat at one of the secondary stations without explanation.

“You're not on watch,” Colman said.

“I know,” she said. She opened the book. “I'll be quiet.”

He went back to his monitoring. The instruments showed nothing anomalous — clean readings across all primary systems, nothing that wanted attention. He ran the standard checks with the practiced efficiency of two years of practice.

“The thing I keep not understanding,” Linh said, after twenty minutes.

He looked up.

“The decision to go to war,” she said. She was reading from the book — she had been reading while she talked, which was a thing she did. “The specific decision. There must have been a specific moment, for each party, when the decision was made. Not the escalation — the escalation was a process. The decision.”

“There were multiple decisions,” Colman said. “Over multiple days.”

“But each decision had a moment,” she said. “Someone sat down and said: this is what we do. And then they did it.” She was quiet. “I keep trying to put myself in that room. To understand what the room felt like. What it felt like to be the person who said: this is what we do.”

“What do you find when you try?”

“Fear,” she said. “I find fear. The kind of fear that makes you act because not acting seems worse.” She paused. “And the specific kind of pride that's the other side of fear — the pride of the person who's

made themselves the one responsible for saying it, who has accepted that someone has to say it and that it should be them.”

“Chen’s pride,” Colman said.

“Chen’s pride,” she said. “Which is not wrong. The pride of the person who makes the hard decision because they’ve convinced themselves they’re the only one who can.” She paused. “That’s the same pride as the people in that room. Chen used it to save six hundred thousand people. They used it to destroy three billion.”

“The decision was different,” Colman said.

“The pride was the same,” she said. “The decision was different because the conditions were different and because — and this is the thing I can’t quite get to — because Chen was right about the conditions and they were wrong about the conditions. His triage was correct for the available inputs. Their escalation logic was wrong.” She paused. “But the pride that drove both of them was the same structural thing.”

“You’re saying the pride is the risk factor,” Colman said.

“I’m saying the pride is the variable that determines whether the right person in the right position makes the right decision or the wrong one,” she said. “It’s not the decision itself. It’s the pride that lets them make the decision when making the decision is hard.” She closed the book. “And the thing you can’t design away. You can’t build a system that doesn’t have people who will take on the terrible decisions. You need those people. But the same quality that makes them able to take on the terrible decisions makes them dangerous.”

“Chen’s dangerous,” Colman said.

“Chen’s dangerous,” she said. “He’s also saved six hundred thousand people. Both are true. The same quality is both of those things simultaneously.” She stood. “I’m going back to bed.”

“Are you okay?” he asked.

“I’m doing the thing I came on this voyage to do,” she said. “Which is thinking through things I haven’t thought through before.” She paused at the door. “It’s not comfortable. But I thought it was supposed to be.”

“No,” Colman said. “Nobody said it was supposed to be comfortable.”

“Good,” she said, and left.

He went back to the monitoring. The ship hummed around him, perfect in its engineered reliability, carrying its three hundred and fifty-one people through the dark between stars, toward a planet that was alive in ways they hadn’t known, toward a planet that was home in ways they hadn’t fully accessed yet.

Both at once. Both true. Both forward.

He monitored until 0400 and then handed over to the next watch and went to sleep, and dreamed of nothing specific, which was the sleep of a man who had found what he was looking for and was in the process of carrying it home.

Kath’s Journal, Final Entry Before Chiron

I’ve been keeping this journal for twelve years — since before we left Chiron, since the planning phase when the questions were theoretical and the people were hypothetical. The journal began as a practical record. It’s become something else. I’m not sure what.

The last entry I’ll write before we’re home:

Steve asked me, last night on the observation deck, whether the mission accomplished what I thought it would accomplish. He

doesn't usually ask evaluative questions — he prefers specific ones. The question was specific in its way, but it was also large.

What I thought the mission would accomplish: demonstrate that the Chironian model could make a material difference in a post-catastrophe environment. Leave tools. Teach. Come home.

What the mission accomplished: the above, less neatly than anticipated, with more complexity and more surprise than the planning allowed for.

What the mission accomplished that I hadn't planned for:

Bernard learning function-first engineering from Chironian twenty-year-olds.

Lechat finding the conversation he needed in Chen's planning room.

Alex finding Mara at the edge of the official greeting party, and choosing to talk to her.

Mara's fabricator efficiency paper, which came from the fabricator I insisted we give her and which Alex insisted we give to her personally.

Tomas looking at his cousins and feeling the gap and loving them anyway.

Linh finding, in Fort Collins, the work that was hers to do.

Saan watching the mountain bird on the far bank of the river and deciding that "interesting" was an adequate and complete response to things that were difficult.

Elena in Innsbruck finding that Bernard took her sign error seriously in four minutes.

Otto's annotation catalogue, twenty-seven readers, one penciled sentence, who knows whose.

None of these were in the mission plan. All of them are more important than most of what was.

The seeds I most carefully planted: the fabricators, the archive, the volunteer placements. Those are real and they matter and they're the structure on which the rest is built.

The seeds I didn't plant: the conversations and the recognitions and the specific connections between specific people, which happened because the people were present and paying attention and not directing each other toward predetermined outcomes.

The seeds I didn't plant are the ones I trust most.

Home tomorrow. Alex has the stone. Steve has the weight he carries that is Earth and that he'll carry as long as he carries anything. I have the journal and what it doesn't contain.

We did what we went to do.

Someone will go back.

Kath.

[FINIS — Full Novel, Complete]

THE VOYAGE HOME: FULL VOICES

What the Ship Heard

The Congreve's communications team maintained a continuous archive of all received transmissions from Earth during the return voyage. This archive was accessible to anyone on the ship, and the way people accessed it revealed something about how each person was carrying the planet they'd left.

Bernard accessed the technical transmissions — the Mountain State's engineering frequency, the Southern Reach's fabricator operation updates, the brief quarterly reports that Fen and Juren sent through Park's relay. He read them with the same focused attention he gave to the drive monitoring systems: looking for anomalies, assessing variance, confirming that the systems were running within expected parameters.

Lechat accessed the governance transmissions. Vasquez sent a regular summary of council proceedings, which she had started because Park had suggested it and which she continued because she had found it useful to have a record structured for an external reader — it had made her more precise about the council's activities, which were sometimes precise and sometimes not. Lechat read these and made notes and occasionally sent responses that were brief and useful.

Alex accessed the Southern Reach community broadcasts — the open-frequency signals that Park's network distributed. The weather reports. The community schedules. The resource allocation announcements. He listened to them the way he'd listened to the

first one, on day forty-three of approach, with the specific attention of someone who is learning the sound of a place as a way of continuing to know it after the sight is gone.

He had told Mara about this in one of his messages, and she had written back: *I know the person doing the Monday community schedule broadcast. Her name is Rosa. She's been doing it for three years. Before her, it was a man named Dario — not the student, a different Dario — who did it for seven years. The voice of the community schedule is the voice of whoever is willing to do it. Currently Rosa. She has very good diction.*

He had written back: *I'd know her voice anywhere now. I've heard it forty-seven times.*

She had written: *That's more times than most people who live here hear it.*

He had written: *I'm not most people who live here.*

She had written: *No. You're not.*

Tomas and Melbourne

The messages from Tomas's cousins in Melbourne came through erratically — the Melbourne community's communications infrastructure was less reliable than the Southern Reach's main network — but they came, and Tomas read them carefully.

His cousin Bea sent the most consistent messages. She was twenty-six, a second-generation survivor — born in year two of the crisis, growing up into the first generation that had no memory of the pre-war world and was therefore working entirely from the world that was. She had a quality in her messages that Tomas had been trying to

articulate for eight months and that he finally wrote to Colman about:

She doesn't compare anything to before. Not once. She describes the water situation or the agricultural cycle or the community governance and she never says "before the war" or "in the old system." She just describes what is.

I don't know if that's because she never knew the before, or because she's decided the before isn't a useful reference point, or because the people around her don't use the comparison and so she doesn't have it as a habit. But it changes the quality of what she says.

She told me about the new water system components — they're using some of the fabricator output from the Southern Reach, traded for agricultural seed stock that Melbourne has developed through eleven years of local cultivation. The trade is direct, no intermediary. She described it as: "We made seeds for what we needed and they made parts for what we needed." No market logic, no scarcity language, just an accurate description of an exchange.

I think she might be the most Chironian person I've met on Earth. Without knowing anything about Chiron.

Colman had written back: *You should tell her that when you go back.*

Tomas had written: *I'm going to. If Lechat lets me on the second mission.*

Colman had not answered that question directly, which was Colman's way of leaving something open rather than closing it. Tomas had noted this and accepted it with the patience of someone who has learned that some answers come when they're ready.

Ora's Year

Ora spent her twenty-six months in Nelson teaching pilots.

She had four students in the first year: three former Southern Reach atmospheric pilots who had been flying smaller craft and who needed the specific technical training for shuttle-class vehicles, and one person who had never flown anything but who had the specific aptitude — which Ora recognized quickly — for the three-dimensional thinking that shuttle operation required.

The non-pilot was named Sam. He was thirty-one, a former structural engineer who had repurposed his skills during the crisis years toward whatever the community needed, which had been many things in succession and had produced a practical competence that was wide rather than deep. The shuttle training was the deepest training he'd received since before the war.

“Why do you want to learn this?” Ora asked him, in the first week.

“Because the connection to Innsbruck changes everything,” he said. “The exchange program — the students going there, the faculty coming here — that connection is going to be the most important single thing that happens in the next ten years. And the connection runs on transport. And the transport runs on people who can fly the shuttles.”

“Practical answer,” Ora said.

“I'm a practical person,” he said.

“Why specifically you?” she said.

He was quiet for a moment. “Because I'm thirty-one and I'm not doing the thing that's most important,” he said. “I've been doing useful things for eleven years. Important things. Necessary things.”

But the most important thing right now is the connection, and I want to be part of it in the most direct way I can be.”

This was, Ora thought, the most honest motivation statement she’d heard from a trainee in fifteen years of teaching. She certified him six months into the training, which was faster than her previous fastest by three weeks, because he brought to it not just aptitude but the specific quality of a person who understands what the skill is for and therefore learns it from the purpose rather than from the technique.

By the time the Congreve returned for the pickup, the Southern Reach had four certified shuttle pilots who had not existed before the visit. The Innsbruck connection had run eleven round trips in the preceding eighteen months. Twelve students had completed the exchange program. Eight were currently enrolled.

Sam flew one of the runs personally on the day the Congreve came back to orbit. He did it well. Ora, watching from the ground, felt the specific satisfaction of having taught something that had become more than what she’d intended.

Elena and the Paper

The sign-error correction paper was submitted to the Chironian technical journal — which accepted submissions from Earth in the specific arrangement Lechat had made with the editorial board — six weeks after the Congreve’s visit to Innsbruck.

The paper was co-authored: Elena (primary), Bernard (technical review and co-analysis), and three Vale Federation faculty members who had contributed to the verification work. It went through peer review in eight weeks and was accepted with minor revisions, which Elena made and which she described to Mara in a message through the Southern Reach relay as “appropriate minor revisions that improved the paper without changing anything that mattered.”

Mara forwarded the message to Alex. Alex wrote back to Mara: *She sounds like you.*

Mara wrote back: *She sounds like herself. We just have some things in common.*

The paper's effect in the Chironian technical community was quiet but significant. The twelve studies that needed to be rechecked were rechecked. Two of them required revisions in the published literature. One of them — the structural composite study — affected a current Chironian engineering project in a way that required redesign of a load-bearing element, which cost three months of work but produced a better result.

The project lead on the Chironian engineering project sent a note through the journal's editor to Elena and Bernard: *Thank you for catching this. The redesign was better for it.*

Elena showed this note to Schafer.

"This is how knowledge works," Schafer said. "Not in one direction. In loops. You catch a thing here, and it matters there, and the mattering comes back."

"I thought it was a small correction," Elena said.

"Nothing is small in the middle of the system," Schafer said. "Everything connects to everything else. The small corrections are the ones that require the most precision to find, because they're hidden in the variance."

Elena thought about this. "That's what I was doing for three months," she said. "Finding the thing hidden in the variance."

"Yes," Schafer said. "Which is why it took you three months." A pause. "And why it took Bernard four minutes once the variance was

located.” She looked at her student. “Both parts are necessary. Neither is sufficient alone.”

Elena was quiet for a moment. “I want to go to Chiron,” she said.

Schafer looked at her. This was not news — she had been watching Elena move toward this decision for six months. “When?”

“After the next academic year,” Elena said. “I want to finish the follow-up work on the sign error — there are four more papers that reference the original framework that need to be checked. After that.”

“The Chironian materials science group has invited you,” Schafer said.

“I know.”

“And Mara Petrov is in correspondence with them too,” Schafer said. “When you go, you’ll be following a trail she’s laid.”

Elena thought about Mara, who was two years younger and who had found the feedstock efficiency improvement from a fabricator in a university lab, and who had built her own scientific reputation through the relay and without ever being inside a Chironian institution.

“She’ll probably be ahead of me on some things,” Elena said.

“Almost certainly,” Schafer said. “You’ll each know things the other doesn’t. That’s the useful condition.”

Alex at the End of the Voyage

Three weeks before arrival at Chiron, Alex wrote the concluding entry in the notebook that Tomas and Saan had given him.

The entry was long — longer than any of the others. He wrote for four hours in the evening, in the observation bay, with the handscreen balanced on his knee and the star field filling the window ahead and Alpha Centauri bright enough to be unmistakable now, specific and warm in the spectrum that matched the light he'd grown up under.

He wrote:

Final entry, this notebook. It's full. I'll start the next one when I have something worth starting it with.

What I understand now that I didn't understand before the voyage:

The material problem is the foundation but not the building. The fabricators address the material problem. What's built on the solved material problem is up to the people who have it. This is obvious in retrospect. It was not obvious to me beforehand.

The specific quality of a person shaped by scarcity is not deficiency. It's precision. The capacity to pay exact attention to exact quantities, to know where everything is and what it costs and what it means — that precision is not a pathology of survival, it's an achievement. Mara's notebooks are the record of an intelligence that has been trained on urgency to a degree that most Chironian intelligences haven't been. That training produced something specific and real.

I have been less precise than I thought I was. The voyage has been an education in the specific.

What I want to do with the next part of my life:

Be part of the second mission. Help design the governance tools I've been thinking about — the radical transparency layer, the competence-weighting mechanism for decision-making. Test them in the Southern Reach context, which is the closest thing to a real-world laboratory for this kind of governance innovation.

Help Mara come to Chiron when she's ready. Not by facilitating — she doesn't need that. By making the connection between what she's doing and what the Chironian materials science group is doing clear enough that the path is visible. She'll walk it herself.

Learn to write the way Kath writes — not to describe but to understand in the act of describing. The journal is a thinking tool, not a record. The record is a side effect of the thinking.

Keep the stone.

What I'll tell people about Earth:

That it's alive.

That it's trying.

That the trying is specific and real — not the generic optimism of people who don't know how bad it is, but the specific determination of people who know exactly how bad it is and are trying anyway.

That Vasquez knows the water allocation for every district of the Southern Reach and has been managing it fairly for seven years.

That Chen Yi-jun opened a community meeting after eleven years of making decisions alone, and sat in the room for four hours while people questioned him, and answered every question.

That Mara Petrov is sixteen and has a published paper in the Chironian technical library and will be at Chiron in a few years and when she gets here she will change things.

That the seeds are in.

That someone will go back.

Alex Colman, late in year six of the return voyage.

He closed the notebook. He looked at the star ahead.

He thought: I'm ready to be home. And I'll be ready to go back.

Both at once. Both true.

He stood up, pocketed the stone, and went to find his father.

What Colman Said to Alex

He found him in the engineering section, which was where Colman usually was when he was working something through — the specific quality of a problem-oriented mind that prefers to think in spaces where problems are tractable.

“What are you doing?” Alex asked.

“Calibration,” Colman said. “The drive’s running at a slight drift from the nominal that will correct itself before arrival. I’m monitoring it.”

“Do you need to monitor it?”

“No,” Colman said. “The system monitors itself. I’m just here.”

Alex sat at the adjacent station. “I finished the notebook,” he said.

“The one Tomas gave you?”

“Yes.” He looked at the drive monitors. “I wrote the final entry.”

“What did you write?”

“That I want to be on the second mission,” Alex said.

Colman was quiet for a moment. He continued to monitor the drift — it was, as he’d said, correcting itself, the way well-designed systems did. “That’s for Lechat to decide.”

“I know,” Alex said. “I’m going to make the case.”

“What’s the case?”

Alex laid it out. He was precise — he’d been thinking about it for weeks. The governance tools, the Southern Reach application, the connection to Mara’s work, the specific value of a Chironian-born person who had already been there and already had relationships with the community.

Colman listened.

When Alex finished, Colman said: “You’re seventeen.”

“I’ll be eighteen by the time the second mission launches,” Alex said.

“The second mission might not launch before you’re twenty,” Colman said.

“Then I’ll be twenty,” Alex said. “The case is the same.”

“The case is not bad,” Colman said.

“It’s a good case,” Alex said, with the specific confidence of someone who has thought through their argument and knows it holds.

Colman looked at his son. The specific person, seventeen years old, growing up into exactly what the voyage had given him the material to grow into. Not what Colman had planned — he hadn’t planned it,

hadn't directed it, had simply been present for it and paid attention, which was all a parent could be responsible for.

"Tell Lechat," he said.

"I will," Alex said.

"And give me the case on paper too," Colman said. "I'll read it and give you notes."

Alex looked at him. "You're going to advocate for me?"

"I'm going to evaluate your argument," Colman said. "If the evaluation is positive, I'll tell Lechat my evaluation." He paused. "I'm not going to advocate for you. If the argument is good, it doesn't need advocacy. If it needs advocacy, the argument isn't good enough."

"That's a Chironian way to look at it," Alex said.

"I've had eleven years," Colman said.

"Fair," Alex said.

They sat together in the engineering section while the drive drift corrected itself, in the specific comfortable silence of two people who understand each other well enough to not need to fill the space. The instruments ticked through their cycles. The ship moved toward home.

Chiron was three weeks away.

Earth was behind them, specific and real, full of specific real people doing specific real things that the seeds they'd left were growing into and through and around.

And between the two planets, in the twelve light-years of nothing that both connected and separated them, a set of human minds was carrying forward the thing that couldn't be sent by relay or

transmitted in data packets or archived in forty-two pages of technical assessment.

The thing you carry in your body. The thing you know from having been there. The thing that changes the way you see the place you started from.

That was what they were bringing home.

The archives and the data and the technical papers were secondary. Useful, important, necessary — but secondary.

The primary thing was simpler and harder to name.

It was the understanding that the distance between worlds was crossable.

That it had been crossed.

That it would be crossed again.

[END — Voyage to Tomorrow, complete novel]

FINAL SUPPLEMENT: THE WORK ON EARTH

Linh's First Month in Colorado

The Mountain State's Fort Collins facility had a rhythm that Linh identified in the first week and that she spent the second and third weeks testing.

The rhythm was Chen's. Not consciously imposed — it had emerged from his pattern over eleven years, and the facility had organized itself around what worked for the people who ran it efficiently, and what worked for those people was organized around Chen's cycle. He was an early riser. The productive work happened before noon. The afternoon was for meetings and coordination. The evening was for review.

This was not the Chironian rhythm, which had no single template because Chironians organized their productive time around their individual energy cycles rather than a shared institutional one. It was not a bad rhythm. It was a specific rhythm that reflected a specific person's optimum.

Linh adapted to it, mostly. She was naturally a late-morning person, which put her slightly out of phase with the facility's early-production culture. She resolved this by using the early mornings — the hours before the facility hit its productive peak — for the work she did alone: the analysis, the writing, the thinking that benefited from quiet.

What she thought about, in those early mornings, was the question she had been thinking about for six years: what is the right relationship between individual authority and collective decision-making in conditions of genuine emergency?

Chen had answered it one way: strong individual authority, because collective decision-making in crisis is too slow and produces too much variance. The evidence for this answer was six hundred thousand survivors.

The Chironian answer was different: collective decision-making all the way down, with individual authority replacing collective only in the specific technical domains where individual expertise is clearly superior. The evidence for this answer was a functioning post-scarcity civilization.

What Linh was beginning to see, in her fourth week at Fort Collins, was that both answers were partial.

The Chironian answer assumed a stable environment — one where the decisions being made were not time-critical and where the variance produced by collective process was not life-threatening. The assumption held on Chiron because Chiron had abundance, and the decisions that mattered most in an abundant environment were typically not time-critical.

Chen's answer assumed a crisis environment — one where individual authority could make faster decisions than collective process and where the life-threatening consequences of variance justified the costs of centralization.

The question Linh was working toward was: what's the answer in a transitional environment? One where the crisis has passed but the conditioning hasn't — where the community still needs the faster decisions in some domains while being capable of the collective process in others?

She wrote in her notebook:

The transitional model is not a compromise between strong authority and collective process. It's a mapping problem: identify the domains where time-critical, expertise-dependent decisions are genuinely required, and limit individual authority to those domains. Identify the domains where collective process produces better outcomes than individual authority, and require collective process there.

Chen has been applying strong individual authority uniformly, across all domains, because the crisis required it and because the system has no mechanism for switching modes.

The open community meetings are the beginning of the mechanism. But they're reactive — they address issues that have already been identified as needing collective input. They don't proactively identify which domains should be collectively governed.

The next tool to build: a domain-mapping process. A regular community activity — quarterly, maybe — that reviews which decisions are being made centrally and asks whether they should be.

She brought this to Chen three weeks later, after she'd worked through the implementation logic.

He read her analysis in silence. He asked four questions. She answered them.

“The domain-mapping process,” he said. “Who decides whether a domain is time-critical?”

“Initially, you,” she said. “With community input. Over time, the community develops the capacity to make that assessment itself.”

“And if the community concludes that a domain I consider time-critical is not actually time-critical?”

“Then you and the community are in disagreement,” she said. “And you work through the disagreement. Which might involve you persuading them that the domain is time-critical. Or them persuading you that you’re wrong.”

He was quiet for a long time. “That process might conclude that my authority is not justified in any domain,” he said.

“It might,” she said.

“How do you feel about that outcome?” he asked.

“I think it’s the right outcome if it’s the correct conclusion,” she said. “Not because I want to eliminate your authority. Because the authority should be justified by the reality of the decisions required, not by the history of the decisions made.”

He looked at his hands. It was a specific gesture — the look that meant he was examining an argument from multiple angles simultaneously and finding that it held.

“I’ll think about it,” he said.

“I know,” she said.

“That’s become my answer to all your proposals,” he said.

“Because you always actually think about them,” she said. “Which is the right answer.”

He looked at her with the expression she had come to recognize as his version of appreciation — not warm, because warmth wasn’t his register, but specific. The expression that said: this person is doing the thing they’re here to do.

“The domain-mapping document,” he said. “Draft it formally. I’ll review it and we’ll discuss before presenting it to a community meeting.”

“How much time do I have?”

“Three weeks,” he said. “The next meeting is scheduled for week four.”

She started that afternoon.

The Southern Reach at Week Fourteen

The council meeting in week fourteen of the Congreve’s Earth visit was the longest single session Vasquez had chaired since year three of the crisis.

It ran from nine in the morning until six in the evening. The item that took most of the time was not the fabricator deployment — that was an information item, well-managed, resolved in forty minutes. The item that took most of the time was the proposal for the Security Council restructuring.

Baxter had submitted the proposal himself, which was an act that several council members had not anticipated and that Vasquez had anticipated for two weeks, since his conversation with Lechat.

The proposal was substantial. It covered four areas: the mandate of the Security Council (narrowed to specifically defined security domains), the composition (changed from appointed to elected with three-year terms), the accountability mechanism (regular public reporting of Security Council activities, with redactions allowed only for specifically defined categories of sensitive information), and the relationship to the fabricator systems (modified to access aggregate

data without individual user data, as specified by the fabricator privacy protocols).

The council debated for seven hours.

The debate was good, in the way that the Southern Reach's council debates had always been good: specific, evidence-based, with people who had thought about the issues and were willing to say what they actually thought. The three people who opposed the restructuring were honest about their reasons — two of them thought the security mandate was too narrow and one thought the elected composition would reduce institutional knowledge. Their objections were addressed, if not entirely resolved.

The vote was nine in favor, two opposed, one abstention.

Vasquez, writing the summary for Lechat afterward, included the sentence: *Baxter voted in favor of his own restructuring. I don't think that's the most remarkable thing I've seen in eleven years. But it might be the most honest.*

The council's first act after the vote was to establish the election schedule for the new Security Council composition. Baxter, asked directly by Vasquez whether he would be a candidate for the elected positions, said: "I'll consider it."

He considered it for three days and then announced that he would not be a candidate but would be available to brief whoever was elected on the full operational history of the Security Council's activities. This was, in Vasquez's assessment, the most useful thing he could have offered.

Bernard's Last Week

The last week before departure, Bernard spent one morning at the Nelson clinic and one morning at the water system.

The clinic morning was Tara's territory. She walked him through what had been built in three months: the fabrication units, the pharmaceutical production system, the training program she'd run for the four local health workers who would maintain the systems after she left. She showed him the patient records — anonymized, organized with Chironian efficiency, the specific format that communicated everything needed and nothing extra.

“You're leaving a functioning system,” he said.

“I'm leaving a system that's functioning now,” she said. “Whether it continues to function depends on whether the people operating it continue to understand it.” She looked at the fabricator. “I've designed the training program to teach principles, not procedures. Procedures break when conditions change. Principles adjust.”

“How confident are you?”

“In the people: very. In the conditions: I don't know. The supply situation is better but there are failure modes that would be hard to recover from.” She paused. “I've identified the three most likely failure modes and the specific responses for each. It's in the documentation.”

“And the person who reads the documentation?”

“Petrov,” she said. “She's the medical officer. She has the full documentation and she understands it. If I'm going to worry about anything—” She stopped. “I'm not going to worry. Worrying about things you can't control is a waste of attention that belongs on the things you can.”

“Chironian prescription,” Bernard said.

“Practical prescription,” she said. “I think Chiron and practical are often the same prescription.”

He smiled. “Often,” he said.

The water system morning was Torres. He walked Bernard through the replacement section — the first sixteen percent, new composite pipe in the ground, fittings correctly done, pressure tests passed. The section of the old pipe that had been replaced was stacked at the edge of the work area — old, corroded in places, with the specific worn quality of infrastructure that had been maintained past its design life by people who had no choice.

“What do you do with this?” Bernard asked, indicating the old pipe.

“Feedstock,” Torres said. “The fabricator can process corroded metal if the input parameters are set correctly. We’re going to get back most of the material value.”

“How did you figure that out?” Bernard asked.

“Mara,” Torres said. “She noted in one of her communications to the Congreve that her materials science research at Innsbruck suggested the feedstock conversion for pre-corroded steel was possible with a modified cycle time. She sent the parameters.” He looked at the old pipe. “She’s sixteen and she’s optimizing our recycling process from three thousand kilometers away.”

“She’s useful,” Bernard said.

“She’s remarkable,” Torres said.

Bernard looked at the new pipe section. Clean, correctly laid, running properly. The specific satisfaction of infrastructure that did what infrastructure was supposed to do.

“What’s next?” he asked.

“The eastern district trunk line,” Torres said. “It’s the worst section — oldest pipe, most degraded. If we can do the eastern trunk, the risk to the whole Nelson system drops significantly.”

“Timeline?”

“At current pace and with the current fabricator output allocated to pipe production — fourteen weeks.” He paused. “Unless we can get more fabricator capacity. The Wellington unit is installed now. If they allocate some of their production time to pipe material for us—”

“Have you talked to Wellington?”

“We’re talking,” Torres said. “The first inter-community fabricator coordination. It’s going to require trust.”

“Start with a small batch,” Bernard said. “Proof of concept. They produce twenty meters of pipe material, you install it, the result is verifiable. Then you negotiate the larger agreement on the basis of demonstrated good faith.”

Torres looked at him. “That’s— yes. That’s how to do it.”

“It’s how trust develops,” Bernard said. “Not by agreement, by demonstration.” He looked at the old pipe stack. “One verified promise is worth ten negotiated ones.”

“Chironian principle?” Torres asked.

“Engineering principle,” Bernard said. “Chiron just applies it to everything, not just to materials.”

The Ship Departs

On the morning of day ninety-four, with the shuttle loaded and the final logistics processed and the six volunteers briefed and in place and the Southern Reach's formal farewell completed, the Congreve began its departure burn from Earth orbit.

The burn was clean and efficient. Bernard had run the drive monitoring continuously for the two hours preceding it, ensuring nothing had drifted during the ninety-four days of orbital operations. Nothing had. The drive came up to power smoothly, the trajectory was correct, the burn executed to within fourteen seconds of plan.

The ship moved.

On the forward observation display, Earth shrank from a presence to an object to a point of light in less than an hour. The point of light was distinguishable from other stars in the solar system's neighborhood for another twelve hours. Then the solar system itself was receding, and the stars ahead were all that was visible.

Colman stood in the observation bay for the first four hours. He was not alone — several people were there, watching in the specific way of people who want to see the thing for as long as it's visible. Tomas was there. Saan was there. Rashida was there, looking at the receding planet with an expression he hadn't seen on her before — not regret, not satisfaction, but the specific quality of someone who has had a long-held question addressed, partially, and is beginning to work through what the partial answer means for the next question.

The children's group gathered naturally at the observation bay's far end — Alex, Tomas, Saan, and the three younger ones who had been too small to have much distinct experience of the visit but who had the specific quality of children who have been somewhere important without fully knowing what to make of it yet. They stood together

without talking much, which was what you did when the talking wasn't ready yet and the looking was still sufficient.

Alex held the stone. He was not dramatic about it — he did not hold it up, did not make it visible, did not perform the holding. He just had it in his hand, warm from his body heat, specific in the way of things that are exactly what they are.

He watched Earth become a point and then become nothing distinguishable, and then he went to find his parents.

They were at the far end of the observation bay, standing close together in the way they stood in spaces that had meaning — not touching, exactly, but near enough to touching that the space between them was intentional.

He stood with them for a while.

Then he said, not to either of them specifically: “We did what we went to do.”

Kath said: “Yes.”

Colman said: “Yes.”

The three of them watched the star field for a while longer. Then Kath said: “Dinner?”

“I'm not hungry yet,” Alex said.

“Later, then,” she said.

They stood. The stars moved, slightly, as the ship continued its burn. Alpha Centauri was ahead — their system, their home, their beginning and their return.

And behind them, getting smaller, getting further, going dark in the distance but never actually going dark because stars don't go dark,

Earth's sun was in the field, one of the ten thousand points of light, indistinguishable from the others, and burning.

Always burning.

The distance between stars is not nothing. It is specific and measurable and very large. It is, also, crossable.

This had been demonstrated.

It would be demonstrated again.

VOYAGE TO TOMORROW — Complete

Word count: approximately 100,000 words

This novel is dedicated to the people who go somewhere hard and come home changed, and who then have the courage to tell the truth about what they found.

ADDITIONAL SCENES: DEPTH AND TEXTURE

The Week Before Departure: Jay

Jay Fallows had one week's warning that his father was going.

He had known in the abstract for six months — the manifest had been public, the departure date had been announced, the preparation at the orbital facility had been visible to anyone who looked at the sky at the right angle on clear days. He had known it the way you know things that are in the future: without quite believing them.

The week before the departure date, he came to believe it.

He had dinner with Bernard three times that week. The first dinner was at Jay's house — his wife Elena, Martin who was too young to understand but who could tell that the adults were in a particular register, and the four of them around a table that was made of local Chironian wood and that Bernard had helped Jay build four years earlier. The food was good. The conversation moved through the comfortable and the specific the way conversations do when the time is limited and both parties know it.

“You're ready,” Jay said, at one point. Not a question.

“The ship is ready,” Bernard said. “I'm as ready as I'll be.”

“That's not what I asked.”

Bernard looked at his son. He had the specific quality that parents have when they're about to be honest about something they've been holding. "The ready question," he said, "is more complicated than the ship question. The ship question has a specification and I've met the specification. The ready question—" He paused. "The ready question is about whether I've done the work of deciding what this trip means. And I've done as much of that work as I'm going to do in the time available."

"And what does it mean?"

"Going back," Bernard said. "In whatever form Earth is currently in. Being part of trying to help it." He looked at his hands. "I was on the ship that left. I've spent thirty years on Chiron living a good life and building good work. And Earth—" He paused. "Earth is still there. Still my origin. Whatever happened to it is in some sense my concern. Not my fault — I know the difference. But my concern."

"You owe it something," Jay said.

"Not owe," Bernard said. "That's not the Chironian way to think about it." He was quiet for a moment. "I'm capable of contributing to what needs to be done. Being capable and not contributing would be a choice I couldn't justify."

"All right," Jay said.

"All right," Bernard agreed.

The second dinner was Jay visiting Bernard at the quarters near the engineering facility that Bernard had been using during the final preparation phase. The dinner was takeaway from the plaza — quick, practical, not particularly notable as food, eaten standing at the counter while Bernard walked through the final drive specification with Jay, who had enough technical literacy to follow it.

“The drive is the best work I’ve done,” Bernard said, midway through the technical review. “The Kuan-yin prototype was good. This is better. The confinement cell geometry that Linh and Hogan worked out — the efficiency is twenty percent better than the prototype at nominal thrust.”

“And off-nominal?”

“Better still,” Bernard said. “The geometry is more stable at the high-thrust end, which means better performance in exactly the conditions where you most need it.” He looked at the specification sheet. “I’m proud of this.”

Jay was quiet for a moment. “I’m proud of it too,” he said.

Bernard looked at him. “You didn’t work on it.”

“No,” Jay said. “But it’s yours. And I know your work.” He paused. “The railroad is mine. The drive is yours. Different scales. Same craft.” He looked at the specification sheet. “You’ll come back,” he said. It was not quite a question.

“In approximately six years,” Bernard said. “Standard deviation of several months. I’ll be sixty-eight.”

“You’ll still be running the engineering section,” Jay said.

“If Lechat still needs me,” Bernard said. “Which he will.”

The third dinner was early on departure morning, before the transit car, with both of them aware that it was the last meal before the real goodbye. They ate well — Bernard had cooked, which was unusual, and had made a specific dish that had been a family meal when Jay was small, which was the kind of gesture that doesn’t require narration.

Martin ate enthusiastically and was unaware of the significance and was therefore the most comfortable person at the table, which was a quality of small children that adults occasionally envied.

After the meal, in the moment before the transit car timing made lingering impractical, Jay said: "Tell me what you find."

"In detail," Bernard said.

"In as much detail as you can manage."

"Six years of letters," Bernard said. "I'll write when there's something worth writing. Which will be often."

"I know," Jay said.

They stood at the door. Martin was held by Elena, watching with the specific attention of a child watching adults do something he doesn't quite understand.

The goodbye was brief, which was the right length for a goodbye between two people who are both engineers and who understand that sentiment is not the primary content of what they mean to each other.

"See you in six years," Jay said.

"Approximately," Bernard said.

He went to the transit car. He did not look back, which was not because he didn't want to. It was because he had said what needed to be said, and looking back would have been something else, and he did not have time for something else.

Rashida's Evolution

The question Rashida had been working through for five years — was the Chironian model exportable? — had three stages, which she articulated in a paper she drafted in year six of the return voyage.

Stage one: is the model exportable in principle?

Her original position, held through year two: no. The model required conditions that could not be deliberately reproduced elsewhere. It was specific to its formation history.

Revised position, reaching year four: partially. The material conditions could be reproduced by technology transfer (the fabricators). The cultural conditions were harder to transplant but might be achievable through extended exposure. The specific question was what proportion of a population needed to internalize the new conditions for the conditions to become self-sustaining.

Stage two: what does “exportable” mean in a context where the receiving population has eleven years of crisis conditioning?

This was the question that had emerged from the Earth visit and that Rashida had spent the return voyage working through.

The crisis conditioning wasn't simply “scarcity fear,” which was what she had initially assumed. It was more layered: scarcity fear was the behavioral surface, but beneath it was a specific framework for understanding what made decisions legitimate. Decisions were legitimate if they had been authorized by someone with appropriate authority, earned through demonstrated competence in managing the crisis. The authority-from-crisis-competence structure was the deep layer.

The Chironian model's legitimacy structure was entirely different: decisions were legitimate if they were made by people with relevant competence, and competence was demonstrated continuously rather

than earned once. The authority decayed without continuous demonstration.

Stage three: could the Chironian legitimacy structure replace the authority-from-crisis-competence structure?

Her tentative answer, after the Earth visit: not by argument. The argument for the Chironian model made sense to people like Vasquez — smart, broadly educated, capable of holding the argument at some distance from her immediate interests. For most people, the argument was abstract where the authority-from-crisis structure was real.

The replacement mechanism was the one she'd described in the Baxter analysis: changing the conditions that made the authority-from-crisis structure rational. When the crisis management became demonstrably unnecessary — when the fabricators handled the supply security, when the water system was reliable, when the pharmaceutical shortage was resolved — the legitimacy of the authority that had managed the crisis began to erode naturally.

The mechanism was not argument. It was demonstrated evidence that the emergency had passed.

Her paper concluded:

The Chironian model is exportable in the following specific sense: the material conditions that make Chironian-style legitimacy rational can be exported through technology transfer. Once the material conditions exist in a sufficient proportion of the population's direct experience, the legitimacy structure adjusts to match the conditions — not overnight, not without friction, and not uniformly across the population, but directionally and sustainably.

The implication for the second mission: the question is not "how do we explain Chironian principles to Earth's survivors?" The question is "how do we make the material conditions that make Chironian

principles rational available to as much of Earth's surviving population as possible?"

The answer is: more fabricators. More widely distributed. More maintained. More operable by local communities without Chironian support.

The second mission should be the fabricator mission. Not the principle mission. The principle follows the material conditions. The material conditions are what the second mission is for.

She sent the paper to Lechat, who read it and added it to the second mission planning archive.

The Fabricators at Six Months: Update

The six-month update from Fen and Juren, sent through Park's relay in month seven of the volunteers' tenure, was the most comprehensive status report of the return voyage.

The report covered: fabricator operational status (all twelve Nelson-area units running, seven additional units online in other Southern Reach communities, three in the Vale Federation, two in the Mountain State, first fabricator unit operational in a Melbourne community at the end of month six), user adoption rates (steady increase across all communities, with early spike-and-settle pattern confirming Colman's prediction), production output by category (medical leading, agricultural supplements second, infrastructure components third, with significant variation by community), and political context (Southern Reach council restructuring under implementation, Mountain State governance transition beginning, Vale Federation student exchange expanded to forty-two students, Melbourne beginning the first-stage engagement).

The most significant item in the report was a single sentence near the end:

The Nelson community, on day one hundred and seventy-eight post-Congreve departure, produced and installed three fabricator components using locally manufactured production equipment derived from the fabricator's own output specifications. The components are functional and working within specification. This is the first instance of the community using Chironian fabrication technology to expand its own fabrication capacity without direct Chironian involvement.

They made tools to make the tools.

That's the thing we came for.

Colman read this sentence four times.

He forwarded it to Lechat with no additional comment.

Lechat forwarded it to the ship's open archive with a one-word annotation: *Yes.*

Saan's Letter to Her Father

In month twenty of the return voyage, Saan wrote her father a letter.

She had been thinking for twenty months about what she wanted to say, and she had finally found the form. She wrote:

Drel,

You've been writing to me about the things you've been working on since we left Earth. The atmospheric cycling improvements, the secondary scrubber calibration, the research you're starting on the

ecosystems of Chiron's western coast. Good work. I can see it in the way you describe it.

I want to tell you something I've been thinking about for a long time and that I couldn't find the words for until recently.

When we went to Earth, I expected to understand it because I had the files. I expected to recognize things from the records. I expected to find something consistent with what I knew.

Instead I found that every moment was specific in a way that the files don't convey. The files are accurate. The specificity is the thing that doesn't make it in.

I found that the specific quality of Mara Petrov sitting at her river path, watching the current with her notebook in her lap and calculating the water allocation for seventeen districts, was more important to me than all of the files about the Southern Reach combined. Not because the files were wrong. Because she was real in a way the files can't be.

And then I came back to the ship and I thought: what do the files about Chiron fail to convey about the specific quality of Chiron? What would someone who didn't grow up here miss, reading about it?

I've been trying to answer this question for twenty months. I think the answer is: the specific quality of what it feels like to make something you don't need, because you want to. The specific quality of choosing a project because it's interesting rather than because it's necessary. The specific quality of working with someone not because you're required to coordinate your efforts but because their thinking is more interesting in combination with yours.

These are the things Earth doesn't have yet. Or has in fragments — Mara's fabricator work is the fragment, the thing she makes

because she wants to understand it. But the surrounding culture is still organized around necessity.

When the surrounding culture changes — when necessity becomes the floor rather than the ceiling — that's when the specific quality I'm describing will be accessible to Earth's people.

The fabricators are the beginning of that.

I think we did the right thing going.

I think you should have come.

Saan.

Her father wrote back:

You're right about what I missed.

I'll come on the second mission.

I've already told Lechat.

— Drel.

The Last Hours Before Chiron

When they were close enough to Chiron that its sun filled the observation bay with the specific blue-shifted light that Colman had grown up in for eleven years and had spent the return voyage slowly recovering the feel of, the ship's common areas had a quality that was different from any of the qualities they'd had at other points in the voyage.

Not excitement, exactly. Not relief. The specific quality of a thing approaching completion — the awareness that what had started as

future was now becoming past, and that the space in between had been lived, specifically and fully, with something to show for it.

Bernard spent the last hours in the engineering section, running the final drive-down sequence that would begin the deceleration approach. He did this with the focused efficiency of someone performing a task they know well and that they find satisfying in the way that well-understood tasks are satisfying when done correctly.

Lechat spent the last hours on the bridge, running through the arrival checklist and the orbital insertion plan, which he had reviewed multiple times and which he reviewed again because he was the kind of commander for whom reviewing things one more time was not superstition but professional practice.

Kath spent the last hours in the atrium, in the specific quality of peace that she settled into when the moment was large and didn't require her to do anything about it except be in it.

Alex spent the last hours in the observation bay, with the stone in his hand, watching his home planet resolve from a point to a disk to a presence.

Tomas found him there.

“Home,” Tomas said.

“Home,” Alex agreed.

“And then?”

“And then the second mission,” Alex said. “When it's ready.”

“You're already planning,” Tomas said.

“I've been planning since month three of the return voyage,” Alex said. “I have twelve pages of notes.”

“Can I read them?”

“Yes.” Alex looked at the planet. “I want you on the second mission.”

“You can’t decide who’s on the second mission,” Tomas said.

“I know. But I want you. For the Melbourne connection specifically — your cousins, the community there, the specific relationships you’ve already built.” He looked at his friend. “The second mission is going to be about the scattered communities. The ones we didn’t reach. That’s where the work is.”

Tomas looked at the planet. “Melbourne,” he said.

“Melbourne,” Alex said. “And the others. All the faint lights.”

Tomas was quiet for a long time. The planet got slowly larger, resolving into the specific features that were home — the continental shapes, the ocean colors, the specific cloud patterns that were different from Earth’s in ways that Colman had said were subtle and that Alex now knew were not subtle at all, because having seen both, the difference was unmistakable.

“All the faint lights,” Tomas said. “Yes.”

[End — Voyage to Tomorrow, complete novel, approximately 100,000 words]