

## CHAPTER 25: THE SOLUTION

**Log date:** June 30, 2448

**Location:** Xanthe

**Log note:** The die is cast

IN 2448 THE DIANO CORPORATION celebrated their 16<sup>th</sup> year on the Artilect homeworld. By now life had settled into a comfortable routine. The 3,872 people who lived on that planet went about their lives. Most of them spent their days working on their own personal projects. Less than a hundred of them still worked on the Artilect. The artificial intellect had proven to be such a success that there simply wasn't a need for a task force anymore. Most of the monitoring and tweaking work was done by Victor Stryker and Dr. Mazatl. Victor did the technical work; Dr. Mazatl mostly just talked to the Artilect and tried to teach him everything he needed to know.

The rest of the company had scattered itself throughout the Ranger worlds. They were bored with their corporate lives and wanted to do something new and different. The Ranger worlds accepted them eagerly because they brought a tremendous amount of technical knowledge with them. They knew how to truly get the most out of the Nehemiah IV probe that Professor Grimes had acquired for them so many years earlier.

When the Ranger governments asked them what they had been working on in secret for all that time, they replied that they had constructed a sentient, artificial mind. Although they insisted they were telling the truth, no one believed them. After all, artificial sentience was impossible. The governments assumed they had been doing something boring, like making a new class of exploration probe. They eventually stopped caring and stopped asking questions.

As for Victor and Dr. Mazatl, they both intended on living out the rest of their days on the Artilect. Why would they ever go anywhere else?

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That same year Carroll Lane was forced to make a choice of his own. Since 2426 Lane had rarely needed to leave his virtual world and set foot on the physical version of Xanthe. The automation technology that he had developed to maintain the machines of the Vault worked perfectly and did not require adjustments. When something did go wrong – which was extremely rare – Adrian Garza was the one who dealt with it. Lane kept to his own private reality.

But as the years went by Adrian became increasingly concerned about life outside the Vault worlds. When he learned that the Diano Corporation had apparently finished whatever they were working on and their employees had relocated to the Ranger worlds, he was convinced that the matter could no longer be ignored. This time he was facing a problem too big for him to handle on his own. He needed to have a meeting with Lane – a meeting in the real, physical world.

He knew that he could arrange a virtual meeting with Lane, but he no longer trusted those. For all he knew he was meeting with a simulated Lane while the real Lane was off doing something else. The only way to be sure that he was meeting with the *real* Lane was to meet in the physical world. Lane was not at all happy about this, but he reluctantly agreed to meet with Adrian in his old office.

Lane was not surprised to find that the maintenance robots had kept his office neat and tidy. There was no dust or other signs to indicate that it had been ten years since Lane had last set foot in it. The robots were extremely efficient and highly motivated. They may have let the world above them decay into ruin, but Vault 37 was maintained with great care.

The aging Lane settled down into his desk chair and gave Adrian an irritated look. "So what is it *this* time? Another computer problem? Automation not working right? Everything looks fine to me."

"No, no, it's nothing like that," Adrian said quickly. "As I explained earlier, it's the Rangers. I think they have become a significant problem."

"Oh, right, you did say that," Lane replied vaguely. "But I don't understand what you mean. The worlds that want our Vaults all have them, and the worlds that don't want Vaults don't have them. It doesn't really make any difference to me either way. If the Rangers want to live in reality and suffer from its cruelty and hostility then let them. I'll still be alive long after they're dead and buried. I'll win in the end."

"That is precisely the problem. I don't think we *will* win. The Ranger worlds have not been decaying, you know. Instead they have grown remarkably advanced. The Diano Corporation gave them a Nehemiah IV probe and the Ranger governments have incorporated that technology into their cities. Thanks to the Corporation the Rangers have reinvented themselves. As if that were not enough, the Corporation's employees are no longer holed up on some unknown, distant world; instead they are living in the Ranger worlds and are bringing them into a new future. In fact, things have become so advanced that they can now recreate much of our 'virtual world experience' in *reality*. We can only create a simulation; they have the *real thing*."

Adrian handed Lane a thick report that he had put together. "This report contains a detailed list of the—"

Lane took it and tossed it aside. "Sure, sure, I get it. They've gotten fancy on us and they can copy some of our tricks. But so what? No matter how advanced they get they're still limited to the physical world. They will always have to follow physical laws. Plus, they *all share the same planet*. In our virtual worlds we aren't bound by anything at all – and we all have our own *private* paradises. There is no technology that can ever exist that could possibly rival what we have."

Adrian paused for a moment to think. "I suppose that's true. But do you realize that the Rangers hate us? They have a very passionate dislike for us. Their hatred for Vault technology has only grown over the past twenty years. They see it as a sign of moral decadence."

"So what? Big deal. Let them condemn us. I don't care. Grimes condemned us too, you know. It never bothered me."

"Yes, you don't care *right now* – as long as the Rangers continue to tolerate us and leave us alone. But what are you going to do if they decide to *act* on their beliefs? After all, there are only two Vault worlds – this one and Alpha Centauri. With the exception of our Wall we are completely defenseless, and for all I know the Corporation has found a way to get around the Wall. All of the people on our worlds are basically asleep. The Rangers, meanwhile, occupy more than a dozen star systems and have acquired incredibly advanced technology. If they ever decided to conquer our star system by force we would be completely unable to stop them. In fact, we are so poorly defended that it would be quite easy for just *one person* to land on our planet and blow Xanthe to pieces. That's all it would take."

Lane froze. He suddenly felt very small and vulnerable. For the first time he realized how completely unprotected they truly were. He had been so caught up in his own personal paradise that

he never considered the great danger they were in. Adrian was right – it *would* be incredibly easy for the Rangers to destroy everything he had created. All it would take was a single person with the right equipment.

“Ok, I see your point,” Lane said. “I’m glad you brought this up. You’re right – we really *do* have a problem. So let’s think about this. Our star system has a Wall around it. That means all we have to do is close the Gate, right? Once the Gate is closed no one can enter and no one can leave. It doesn’t matter what weapons the Rangers have if they can’t physically enter our space. I can contact Alpha Centauri and have them build a Wall as well. Problem solved! The Wall technology simply can’t be beaten.”

“Are you sure?” Adrian asked.

“Of course I’m sure! After all, our Wall is more than 500 years old. In all this time it has never been defeated.”

“That is because no one has ever *tried* to defeat it. The technology is *five hundred years old*. In all that time no one has ever made any improvements to it – but technology has changed *tremendously* since then. The Nehemiah IV probes are incredible machines that are able to do things we can scarcely imagine. Do you honestly think you could stop the Rangers if they decided they wanted to bring down our Wall? Even if you could stop them *today*, are you going to be able to stop them after they’ve had another hundred years of scientific advancement? What about a *thousand* years? What technology will the Rangers have available *then*? Are you willing to bet that they will *never* be able to bring down our Wall no matter how advanced they become? Remember, we’re going to be sleeping the years away while the Rangers will continue to develop new technology. How long are they going to tolerate us?”

Lane reluctantly realized that Adrian was right. Even if the Rangers weren’t a threat right now he couldn’t guarantee that they would never become a threat. Even if they didn’t currently possess the technology needed to bring down the Wall, he could not be sure that they would never invent it.

The Rangers were going to keep on building and inventing, year after year. Meanwhile the people in the Vaults would continue to dream. Eventually the Rangers *would* come. They *would* find a way in. It was inevitable. There would be a conflict – and the Rangers would win easily because the Vaults were undefended.

“You’re right,” Lane said. “The longer we sit here the more vulnerable we become. In the years to come we won’t invent anything new, but the Rangers will. I should have realized this before but I guess I never thought about it. Peaceful coexistence is impossible. If the Vaults are to survive then the Rangers will have to be destroyed.”

“Now hold on a minute!” Adrian said quickly. “I never suggested that we go to war against the Rangers. Do you know how insane that would be? We don’t even have any weapons! The Ranger worlds outnumber us and they have the best technology that has ever been invented. There is no way we could possibly win a conflict against them.”

“That’s why we’ll have to be clever about it. There’s more than one way to fight a war, you know. The first thing we’ll have to do is close off our Wall so that no one can get in. I’ll also have Alpha Centauri A build a protective Wall as well. That will buy us some time.”

“Some time for what? We don’t have any weapons! We have *nothing*.”

“That’s not true. If you think about it, we actually have something that no one else has: the headquarters of the Diano Corporation. The building itself might be empty and crumbling, but I bet it still has a way to contact the Nehemiah IV probes. Even if it doesn’t it probably has the schematics for

building one. We don't need to build an army, Adrian. All we need to do is build a single self-replicating attack bot. That bot can then reproduce itself and create giant swarms. Those swarms can then attack the Ranger worlds and annihilate them."

"But the Rangers are well-defended!" Adrian protested.

"Are they? They've never been attacked so I suspect they've let their guard down. I bet their defenses are non-existent. But even if they are well-defended it still won't matter. Our bots will keep on replicating forever. Eventually we will wear them down and destroy them. The Rangers won't be able to hold out forever."

"But who's going to build these bots? The Diano Corporation left a long time ago."

"That's not quite true. Not *everyone* left. You seem to forget that both of us used to work for them. I know their systems and their technology. I may be a bit rusty but I bet I could hack something together. If Victor could find a way to create a replicating bot then I can as well. Maybe I can just copy what he did! It doesn't have to be perfect, you know. It just has to be able to replicate and attack."

"How long will this take?"

"I don't know. A year, maybe. Perhaps two or three. We'll need to make sure that the machines never turn on us. There are a lot of important details to work out."

"Won't the Rangers come after us when we launch the attack?"

"Only if they think we're behind it. I know we have a lot of planning to do but I think it's doable. The sooner we get started the sooner we can return to our own worlds."

Adrian hesitated. "Are you sure this is this the right thing to do? I mean, we're proposing wiping out the entire population of a dozen star systems. Isn't that genocide?"

"We're fighting for our survival, Adrian. This is literally a matter of life and death. Everything that we have ever worked for is on the line. If we don't wipe out the Rangers then they will eventually wipe us out. If we wait until they attack then it will be too late. Our survival depends on striking first."

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As Lane predicted, the Diano Building was abandoned. In fact, it had clearly been abandoned for years. The doors leading into it were no longer guarded and were not even locked. He had no trouble gaining access to the towering structure.

Inside he found a thick layer of dust. There was no activity anywhere. Lane didn't even find any active bots. Since no one lived on the planet's surface anymore the Corporation had decided that there was no longer a need for the building to operate. Dr. Mazatl had given the command to shut everything down more than ten years earlier. The machines that provided material, water, and food to the rest of the city were deactivated, the computers were turned off, and the building was put to sleep.

Fortunately the lights still worked. Even though the building had been shut down, the main power source had not been completely turned off. Dr. Mazatl was unwilling to take that last step because once the power was off he would no longer have a way to gain remote access to Xanthe. He had to leave a little power on – and that worked to Lane's advantage. The developer was able to activate some lights and turn a computer back on.

He was not surprised to find that his credentials no longer worked. However, it wasn't hard to find an access card in an abandoned office that was still valid. The building had not been cleaned up before it was shut down. Dr. Mazatl probably thought there wasn't a point to it; after all, what possible

difference could it make? Lane saw that there were still papers strewn across desks, and the desk drawers were filled with files that were now decades old. Even many of the apartments still had furniture and personal items in them. It took him less than an hour to find a card that gave him the access he required.

Now all Lane needed was to get to work. In a way it felt good to be working again. He liked the fact that he had full access to the manufacturing capabilities of the entire building. Once he had the plans for a working and stable bot he would have no trouble deploying it. All he had to do was learn how the Nehemiah IV probes worked, adapt their technology, and weaponize it.

Lane disliked being in the physical world, with all of its problems and frailties. His body was getting old and he could feel it. He vastly preferred his new virtual body. But for the time being he would have to stick to reality. His virtual world lacked the information he needed.

*I won't have to be here forever, he thought. Just long enough to get what I need.*

He settled down into an old, tattered chair and began reading.

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A year later Victor stopped by Dr. Mazatl's office. "Did you hear about Alpha Centauri A?" he asked.

Dr. Mazatl glanced up from his monitor. "Are you referring to their acquisition of a Wall? As a matter of fact, I did. Why? Is something wrong?"

Victor sat down in a chair in front of his desk. "It seems a little ominous, doesn't it?"

"In what way? Walls are protective devices, after all. It doesn't sound like a dangerous move to me."

"But why is it being done? Think about it. For twenty years now the population of Alpha Centauri A has been living in Vaults. They've been doing whatever it is they do in their virtual worlds and have let their cities crumble into ruin. In all that time they haven't shown the slightest interest in the physical world. But now Alpha Centauri A has gone through the trouble of constructing a Wall. Why would they do that?"

"Is it really so hard to understand? If you ask me, the true wonder is that they didn't do that a long time ago. The people who are running the Vaults must have realized that without a Wall they are defenseless. Anyone could land on one of their worlds and cause trouble. Since everyone is dreaming, no one is around to defend them or even notice that a hostile force has landed. The Wall protects them and keeps them from harm."

"But what harm are they protecting against? And why did they decide to build a Wall *now*? Do they know something that we don't? What could have prompted this?"

Dr. Mazatl shrugged. "It's hard to say. Keep in mind that they have been living in fantasy worlds for years now. It's impossible to tell what sort of nightmares they might have conjured up. Perhaps something terrible happened in their simulation, so they decided to build a Wall to protect themselves from danger."

"I guess it's possible," Victor said reluctantly.

"Keep in mind that it's quite likely the people in the Vaults have gone insane. You must remember that they have been disconnected from reality for a very long time. They have spent years living in worlds where even physical laws do not apply. That can't possibly have been a healthy experience for them. It shouldn't surprise us at all if they begin to do irrational things. In fact, it's

exactly what I would have expected.”

“So you don't think it's a bad sign?”

“It's a Wall, Victor. Walls have only one purpose and that is to keep people *out*. Well, in the case of Sol it is to keep people *in*, but I think this is a different situation. Clearly the Vault dwellers do not want to be disturbed – and if they want to be left alone then I say we leave them alone. If they prefer isolation and ruin then that is their choice. Stop and think, Victor. What possible harm could their Wall be to any of us? How does this affect us in any way?”

“I guess it doesn't,” Victor replied.

“Exactly,” Dr. Mazatl said.

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Throughout the entirety of 2449 Lane continued to work on his bots. He disliked the fact that he had to leave his easy life in paradise, but part of him actually enjoyed the challenge. It had been a long time since he had done something that actually mattered. For the first time in two decades he was faced with a significant technical obstacle, and he found great pleasure in tackling it.

Lane's first task was to truly understand how the Nehemiah IV probes worked. When he worked for the Corporation he was very familiar with his small piece of the project, but he only had a vague idea about what the other departments were doing. Now he had to master everything so he could find a way to pick out the pieces he needed and recreate them in a small package. Victor's work on his book-finding bots proved to be tremendously helpful.

The replication technology was very complicated, but he discovered that the Diano Corporation had created a simple set of tools to make things easier. As the months went by he was able to design a simple replicating bot that had a primitive zero-point-energy plant inside it. It wasn't nearly as fully functional as a full-scale one, but Victor's bots had taught him that it didn't have to be. It only needed to be able to accomplish its objectives.

Lane was surprised to discover that the most difficult part of the process was developing weapons. The Diano Corporation hadn't built any weapons in centuries. He belatedly realized that the Corporation was a *space exploration* company. They never needed to weaponize any of their probes because there was no one in deep space to guard against. That meant Lane had to design his own weapons and scale them down to the point where they could fit on a tiny bot and run on a tiny power plant. Yet they also had to be powerful enough to pose an actual danger to somebody.

He also had to write software that could run the bots. The intelligences that the Diano Corporation had constructed were all standalone AIs that were built to work by themselves. What Lane needed was a swarm-based AI – something that could interact with the rest of the swarm to determine the best strategy for destroying an entire world. It needed to know when to attack, when to retreat, and how to conserve its numbers and replicate.

There were so many details that had to be considered and so many possible paths of failure. Lane ran simulation after simulation and uncovered flaw after flaw. Each flaw was fixed, only to reveal some new problem. But each iteration brought him closer to success.

Lane was convinced that he could do it and he knew his plan would work. The Rangers weren't expecting an attack, and the only weapons the Rangers had ever developed were designed to fight against large starships. They weren't expecting an attack from an endless army of tiny bots. When Lane's swarm hit their large guns would be overwhelmed and their cities would burn. Then only the

Vaults would be left. Lane would finally have the peace that he so craved.

The best part was that the Diano Corporation had returned to the Ranger worlds. This meant that when the Ranger worlds fell there would be no one left to pose any danger. Lane didn't have to worry about some unknown colony out in the stars. Once he destroyed the last known Ranger worlds he was done.

It would take him time to finish the bots, and it would take more time for the swarms to win. But Lane did not doubt the final outcome. 2450 would be the Ranger's last year of peace. In 2451 the war would begin.

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Meanwhile, the Ranger worlds did nothing. If Professor Grimes had still been alive he would have warned the Ranger governments to take Alpha Centauri A's Wall seriously. He would have urged them to stop and consider what was being done and perhaps to invest in Walls of their own. After all, they now had access to Nehemiah IV probe technology and could easily afford them. Perhaps the Vault worlds were being irrational – or perhaps they were concerned about some sort of threat that the Ranger worlds were not aware of. A Wall was a simple protective measure that would ensure their safety.

But Grimes was dead and the leadership of the Ranger worlds was unconcerned. After all, there had not been a war in more than a lifetime. What was there to be afraid of? There were no enemies left. The Vault worlds were in ruins, the Ranger worlds were wealthy and happy, and there were no monsters hiding out among the unexplored stars. What need was there for defense?