**Chapter Eighty-Five**

I entered the wizard’s sanctum, Oz looking up from his desk. “Ah, Jaune, just the man I wanted to see. Is this about yesterday’s operation?”

From his tone it wasn’t a rhetorical question, but I wasn’t here for that, and, pausing, tried to think of what there was that I *could* be coming to talk to him about. When I’d transformed, at the ‘end’ of the worst of it, going *full* Dragon, the cloud cover had been heavy, and I’d even used a *tiny* amount of Ice Dust infused Flame, spread as thin as I could make it, to even *more* cover for myself, the impromptu snowstorm gone before it’d even breached the clouds below, as I’d *emptied* myself of Flame, but at it’s *full* potency, instead of the shadow of a *shadow* of my capability, which was what I was limited to when I breathed it out in my ‘humanoid’ form.

Mind you, switching down from *Majestic Dragon* to ‘not-a-Faunus’, I’d found controlling the high-potency Flame was *far* harder than I’d thought it would be, the difference between going out for a light jog and trying to run through *pudding*, but in terms of ‘go hit roughly that spot’, with gravity working for me, *and* several hundred feet of distance to correct for, it had been doable. Getting it to curve *around* the fighters on the ground when it splashed was a bit more difficult, but, again, within my skillset.

That said, it’d *worked,* and the wrap-up when the Grimm turned tail and ran, which was a thing they apparently did, had been pretty simple, the creatures thankfully *not* returning back to their hidey-holes but just fleeing blindly over the landscape. That let us pick off the groups that were heading towards local settlements, the other groups tagged to be taken care of by professional Huntsman teams.

All in all, it was an invigorating evening’s work, and a confirmation that *everyone’s* capabilities were generally where we thought they were, but was otherwise uneventful.

“Uh, *no?*” I questioned. “It went well, right? Was someone seriously injured? Everyone in our quadrant? Pentrant? Quintant? Everyone in our *section* was fine. Even Weiss still had a quarter of her Aura left. And *that’s* saying something.”

The Wizard paused, looking over his glasses incredulously at me, before shrugging slightly. “I would say it went *more* than ‘well’, but no, no one was injured beyond our Ms. Peach’s ability to see to. You *really* have no questions?”

“I mean, once Oobleck and the others have a chance to poke around, I’d like to know what they find, but that’s about it,” I offered, pausing to get a nod from the much, *much* older man, confirming that I would get such a report. “No, I’m here to talk about the CCT network. It. . . it’s *impressive* but, well, its security. . . *doesn’t exist*.”

Oz frowned, glancing at his own terminal. “I would be inclined to disagree, however, given your own device, would I be remiss to say you have knowledge of other such systems?”

“You would not,” I admitted, taking a seat and summoning my Company ‘Scroll’ to my hand. “How much do you know about the CCT?”

The Wizard stated slowly, “Well, it’s a bit like *radio*, from what I understand. There were attempts at placing satellites up in orbit to extend our communicative capabilities, but Dust sadly loses its potency once it is far enough from Remnant, for reasons no one quite understands, so the towers were created instead,” he said, waving upwards, to the top of *his* tower, where Vale’s CCT transmitter stood. “I am told it uses the nature of Dust, and how it moves through the sky, to spread out the effect, but the *entire* world needs to be covered in order for it to function. That is why *all* four of the main towers are needed.”

Oz smiled, “I find it. . . poetically apropos that it is only by joining together, can our modern world function. But. . . there is an issue? Is it *that* weakness you are concerned about?”

“No,” I disagreed, shaking my head. “Okay, so the problem isn’t with the CCT *itself*, only. . . wait, are there local backups, for intra-kingdom communication if there’s an issue with the worldwide network?”

“There are *not,*” the Headmaster noted, with mild annoyance. “When I ruled Vale, there were such things, but it was considered an. . . *unneeded expense* in recent decades*.* I can assure you, it will not *remain* such. But that is not the issue either,” he mused to himself, curious.

I held up a so-so hand, wiggling it back and forth, “Well, that *is* a problem, but, yeah, it isn’t the CCT I’m talking about, it’s how it’s *used.* It’s something that Weiss said,” *at my prodding*, I mentally added, “about the nature of these devices. So, sorry, I’m doing this wrong. I guess the better question would be do you know how *computers* work?”

The ancient man started to respond, paused, then admitted, “I know *how* to work them, but that is not the same thing at all. I have been told the ones I use are secure,” he stated, motioning to his terminal, “but they are not?”

“Do you have to put a password in to your system to access it?” I questioned, and he nodded. “Is it something that someone who knows you could guess?”

“It. . . *is,* but they would have to enter my office and sit in this seat in order to access it,” he stated. “And *that* is not as easy as it seems, if one other than myself wishes to accomplish that deceptively trivial task.”

Toggling on my scroll, I sent him the message I’d prepared, with the code I’d kludged together earlier using some of the examples from my Sweet Home’s library, with me just filling in the specifics of how *Remnant* computers worked. I found examples of how to handle things all the way to *The* *Culture’s* ‘clarketech BS’, which was *completely* incomprehensible to me, but, thankfully, while superpowers *had* gone into developing scrolls and such, it wasn’t *too* complicated for me to copy and paste the bits that I needed into the pre-written code.

*Yes,* that made me a ‘script kiddie’, but *no,* I didn’t care as this was just a demonstration.

Oz clicked it, and his screen went dark, his input devices disabled, as I was given full control over his terminal. Toggling on the hidden projector in the room, it extended, and activated, displaying a holographic smiley face.

“Are you *sure* I need to sit in that chair?” I questioned dryly, turning off the projector and running the ‘reversal’ program, giving him control back.

“I appear to be mistaken,” he remarked, voice low, frowning. “How did. . . the CCT?”

“It’s a networking issue,” I agreed. “Okay, so, the first thing you need to understand is that computers are super-intelligent *idiots*.”

Oz lifted an eyebrow, “I have met a few of those. They are difficult to work with, if you do not understand them.”

I nodded, “But, if you do, it’s almost *too* easy. Computers are like that, in that they do *exactly* what they’re told to, nothing more, nothing less. Think of it like your terminal is your castle, where you have valuable documents, and secrets, and your programs are servants that do various things but never leave it. With me so far?”

“That is *not* how castles function, but I understand your intent,” the ex-*king* stated with thoughtful amusement.

“Now, in order to do things, you have instructed your guards to only allow whoever has the passcode, and who sits upon your throne, to issue edicts,” I continued, gesturing to the terminal. “But, again, they’re all *idiots*, so they keep a record of *everything* you’ve told them, and refer back to that, trusting it more than their own memories, but they’re so fast, it doesn’t hold things up. Now, the most *common* form of security breach would be someone who gives the passcode, walks up, sits on your throne, and starts issuing orders that *isn’t you*. And, as they have your password, they’re obviously you to the guards, and the servants, even if they’re a woman, or a Faunus, or a child, or all three. *This* is what you’ve protected by warding this room. But the problem is that your castle isn’t on its own, but has a tunnel built into its side that leads into the road system that heads to every *other* castle in Beacon, which itself has other, *larger* tunnels that lead to every *other* city, which themselves are full of ‘device castles’.”

Lifting my scroll, I stated, “Now, what *I* did was send you a ‘package’. It was an oddly sized package, *far* too big for what it should be, a message envelope the size of *bullhead*, but you have given the order for *all* packages to be allowed inside, and your guards and servants are *so* stupid they looked at each other, shrugged, and went, ‘yes, Sir!’ Then, when it was inside your castle, the squadron of *enemy* servants that work for me ran to the record room that everyone keeps to know how to do their jobs, and changed it to write what I’d *told* my servants to make it say, which *they* kept on a small little record of their *own* inside the box *they* were hiding in, because they’re *also* idiots,” I stated, simplifying the rootkit hack for someone with very little digital experience, but likely *loads* of medieval warfare expertise.

“Then, when your servants went to go check what *they* were supposed to do, because, you know, *idiots*, when it said ‘ignore what that person on the throne says, and if he asks for a report just give him a black piece of paper, but any order that comes in through the tunnel that has *this* mark should be followed the same way you used to listen to the throne guy’, they just shrugged and went, ‘okay’. Because-”

*“They are idiots,”* the Wizard completed for me. “Could others do what you just did?”

“Could? Yes. *Would?* Not without a specialized Semblance, and an understanding of programming,” I answered easily. “I borrowed that trick from another, and, to be honest, *I* don’t know how it works, other than it does. There’s ways to protect against it, which makes things *less* convenient, but much more secure. It’s *always* a trade off between the two, though it’s *not* one-to-one. That said, the number of people whose scroll password is *literally* one two three four five would *astound* you.”

Oz sighed, “No, I don’t think it would. So, removing this ‘tunnel’. . .?”

“Would be ‘air gapping’, and make your terminal un-hackable, but also make it a pain to get data on and off of it, meaning you’d have to physically plug something into it, work on it, and then take the storage device and plug it into a ‘castle’ that *does* have a tunnel. And, if the ability to connect to networks is still there, and someone ‘smuggles’ in another crate full of enemy servants in a shipment of reports or something, they can just re-open the tunnel and you’ve got the same problem, but that’s just *one* way of handling security. Adding restrictions about just *how* the instructions your ‘servants’ follow can be changed is another, but for every layer of protection, there’s a way around it. Unfortunately, Atlas is, well, *Atlas,* so they think keeping their *autonomous soldiers* all operating off of a *single network* with no restrictions on them is a *great idea.* Because it’s *so efficient.*”

That got a laugh out the King of Vale. “That *is* one of their highest virtues. To the point it becomes a vice.”

“The issue *then* becomes that they’ve built *everything* that way,” I agreed, the bastard child of Russia and Germany pushing forward technological progress while being downright *autistic* about it, to the point of, *ironically,* Remnant’s only World War in recent memory. “ The scrolls they produce have these problems. Their vehicles do. *The Vytal Festival’s floating Amity Colosseum* does*.* And the way their security structure works, it’s *centralized,* so if the CCT tower gets compromised, *everything that connects to it gets compromised as well.”*

It really was an issue of the tech being *so* emergent that it hadn’t been idiot-proofed by human malice and/or stupidity, modern scroll tech less than *thirty years old*. On Earth, that’d be like going from the 1940’s, when computers took up an entire room, to not *even* the old Atari, and over a decade still to go before the very *first* Windows computer was made, only we now had lossless worldwide wifi in this under-populated dimension with devices that the twenty-twenties were just *starting* to catch up to. Hacking was pretty much *unknown* as a practice, but, from what little I remembered of the canon path of this world, from watching the show, and then just clips, *Salem* had a black hat on staff, because of *course* she did.

“Heck, it might be that if *any* of the four towers gets taken over, it’d give the person control over *everything*. Consider the CCT like a. . . Okay, I don’t have a good example. It *is* most of the roads, but it’s also, in a way, the destination everything goes to *before* it goes to the specific castle it’s *really* being sent to,” I explained.

“It’s a port city, of a sort,” Oz noted. “A bit like Antallagi, in Mistral.”

Shrugging, I continued, “That works. So, once they have control over the port that all the messages pass through, they could, say, send a message to the Grimm Cells,” I stated, pointing down, “and those messages would have *your* ‘digital sigil’ on it, which they have on record to know what it looks like, so the computers that control things down *there* think the order comes from you, and does *whatever* ‘you’ say you want it to. If you have something that’s *only* connected to a small, physically linked network, where certain orders *have* to come from within, and only one computer handles the ‘road’ out to the larger network, that can help. If that’s true, then as long as the connector ‘castle’ isn’t compromised, they *physically* don’t take over one of the already connected ‘castles’ in the network, or they don’t add one of their *own* to those *physical* wires that connect things, it’d stop problems. However, well, the CCT is *everywhere*, so, if in the interest of making things *easier* than the Grimm Cells were to connect to *that*. . .”

The Wizard stared into the middle distance, hands folded in front of himself, as he took a deep breath, before letting out a forceful sigh. Looking up at me, he questioned intently, gaze sharp, “And you could have done so? Released them?”

“Not *easily,*” I replied. “I’ve *seen* that projector, so I *know* it exists, and it was attached to your computer about the way I thought it would be. It was in the ‘room’ in your ‘castle’ I expected to be,” I rephrased, getting a nod from the ancient man. “However, if I’d uploaded, er, sent something in that gave me control in your castle but that *didn’t* cut you out, instead just sitting in the background and feeding *me* information, I could poke around, explore your ‘castle’ to find interesting things. However, if I don’t *know* about the captured Grimm, unless it’s *literally labelled ‘captured Grimm dungeon’* or something similar in the system files, all I’m going to see is that you have a lot of doors, *somewhere,* but I’m going to have no idea *where these doors are*.”

The Headmaster frowned, “But would you not see the holding area’s location?”

I shook my head, “No, because they’re not *actual* doors that you’re manipulating, but merely, in a specific room, that you get to by going through *another* room, that you get to by going through *twelve more rooms,* and this specific room might read something like ‘floor two dash five room seven door’ on its entrance, there are bunch of switches that are labelled things like ‘darken/lighten’, ‘muffle’, ‘lock’, ‘raise/lower’ and so on, with more if they do anything *else*. If you know *generally* what you’re looking for, you can probably find it *eventually,* but if you don’t know it exists it makes everything a *lot* more complicated. That *also* means that someone getting somewhere they shouldn’t can do a *lot* of damage by flipping random switches. Know that this shit is *complicated,* Oz, and I *barely* know what I’m doing when it comes to this sort of thing, but I know *just* enough to realize that there’s some *serious* problems here.”

“Understandable,” the Wizard nodded, deep in thought. “It reminds me a little of dealing with the issues I had with some guilds, which kept their secrets in code. Only more so, as those codes had to relate to *actual* practices. I had assumed that, *being Atlas*, this would be fairly straightforward but I appear to be in error.”

Wincing, I shook my head. “No, it *is* straightforward, *too* straightforward, but it’s hundreds, thousands, *tens* of thousands of *really* straightforward things stacked on top of each other until it’s. . . like looking at a flat map of an ant colony. But when you get someone who’s a *little* twisty, they can start to make things work in ways that the original designer never thought of, because *that’s not the way it was meant to work*.”

The look the ancient man sent me was a *little* patronizing, as he commented, “A maze can be made of straight lines, but it curls in upon itself all the same. This seems to be a maze, not purpose built, but labyrinthine all the same.”

Processing that, I slowly nodded. “Oh, yeah, okay, I guess, I’m kinda wrong in that, but you get what I mean. So. . . maybe get someone who *does* know what they’re doing? Maybe, I don’t know, put a team together of people from Atlas, Mistral, and Vacuo?”

“Not Vale?” the Valian inquired.

“Vale thinking, from what I can tell, is generally well-meaning and cooperative,” I admitted, “but you don’t need ‘hey let’s all work together’ for digital security, you need a lot of twisty people to out twisty the *bad* twisty people. Though, yeah, someone from Vale might be needed, if only to look at the suggestions the others come up with and say, ‘Yeah, no one’s actually gonna do that,’ in order to sanity-check their solutions.”

Oz smiled slightly, “You might be overestimating my people a little, but, *yes*, a diverse team would be better. This has been. . . *quite* the discussion. Thank you for bringing this to my attention. While it *should* go without saying, I would appreciate it if you would *not* mention this to others.”

Holding up a forestalling hand, I replied, “Don’t worry, I know loose lips sink ships. Though, if someone *was* going to try and make a move, the Vytal Ball would present an opportunity to ship in some enemy servants to some key castles. Eventually, it might be worth it to add some kind of scroll security slicing class, maybe for seniors, once you understand how*,* as I’m sure that bandits and such use them too. For now though, and *definitely* until after the Vytal Festival, I’ll not mention it to *anyone* else. Even my teammates.”

“Thank you, Jaune. Again, I appreciate you bringing this to my attention,” the Wizard stated, repeating himself as his attention was clearly elsewhere and waving a hand towards the elevator. “Now, if you don’t mind, I am going to need to make a *large* number of calls. Possibly *insecure* calls,” he added unhappily.

Opening a portal, I got up from my chair and told him, “Well, you’re in charge of this circus, which means *you* get to handle it.”

“Heavy is the crown,” Oz agreed, as I started to head back Home. “But an empty throne, I have come to realize, weighs *far* more.”