

Vitalus

“T-60 seconds to launch!” Yelled the commander.

“Last brief: The break-away asteroid is eight metres in diameter and 33,520km away, our ship, the latest model, gives us 40 minutes of space travel, there and back. The asteroid moves at forty kilometres per second, land in front at the correct speed and trajectory would allow for a maximum of 4 minutes for extraction and sample collection. Equipped with a hydraulic arm, it’s capable of handling even the most delicate tasks. The ship will hook itself onto the asteroid, slowing it by 17%, allowing for more control, giving enough time to extract as many samples as possible. Good luck.”, briefed Professor Robert Prekker.

“T-5, 4, 3, 2, 1, liftoff!”

Cameras flashed as reporters huddled. Professor Prekker sauntered onto the podium, facing a mass of world-renowned scientists and professors, in addition to the stream of reporters behind. Gathered today to witness the groundbreaking discovery Professor Prekker has claimed to provide.

“I shall begin by thanking my crew and team for they have risked their lives for Earth’s benefit.

David Babrow, Jean Jara, Kyliegh Dinovo, and Paige Margotta, I thank you for devoting your heart and soul to this mission as it was no easy feat to collect samples on an asteroid moving forty kilometres a second.” Applause celebrated their remarkable achievement. After a brief pause, the professor continued, “To those who are unfamiliar with my work, let me introduce myself. I, Professor Robert Prekker, am an astronomer as well as a visionary. I have always believed in reshaping or terraforming, other planets to save humanity from the chaos today. Years ago, a pandemic broke out, killing thousands as well as weakening the strong. Almost every two years

have we seen another outbreak, resulting in the same scenario. Owing to this, countless scientists have developed theories on solving this issue, numerous include vaccines or improvements in healthcare, but I believe it's too late. Technology has evolved over the centuries, but so has microorganisms and their abilities to resist against our vaccines. We cannot match these microorganisms; their evolution rates surpass our rates of vaccines. My solution is to terraform nearby planets. This hasn't been proven possible until three months ago." A gasp from the scientists and the scribbling of notes from the reporters assured him of their attention.

"The 119th element, Vitalus!", he announced with confidence, "Vitalus has, evidently, improved and greatly supported my theory. Mars and Earth are very similar in structure, with a core, crust, a thin layer of atmosphere with two polar ice caps and soil filled with iron. These attributes mimic Earth's, but why can't we sustain life on Mars? Three key factors, the intense radiation, greatly reduced air pressure and the atmosphere only containing 0.16% of oxygen. While interpreted as an atmospheric problem, the issue plays a role throughout the spheres of sustaining life, the hydrosphere, atmosphere, lithosphere and biosphere. Now, what has this got to with Vitalus? Vitalus is an element, at room temperature, it's a highly viscous white substance, becoming solid at -600degrees Celsius, at 200degrees it evaporates into a gas, regarded as a nonmetal on our periodic table. On its own, it doesn't have any unique advantages or abilities, but as tested, much like hydrogen, it has managed to participate in ionic and covalent bonds, depending on the element, but it can form these bonds with any element in our periodic table. But it's the ability to strengthen that gives it its uniqueness. Combined with gold, it increases its tensile strength to more than 1000WWW, with 18karat gold alloys only stretching up to 880N/mm². To this extent is all I've managed, I envision that this element, combined with Earth's, will terraform it, creating a new Earth. As an astronomer, it's now beyond my field of expertise; thence I'm here to recruit and partner with scientists and professors exemplary in the fields of geochemistry, oceanography,

meteorology and a molecular biologist and ecologists. These fields are mainly the representation of our Earth's four spheres for life. My vision is that our partnership will be able to terraform Mars into a habitable planet. A world with breathable air allowing us to continue our daily lives as we would on Earth, creating geologically similar geography, atmosphere, ocean and life."

As he finished, an array of questions came hurdling upon him.

"Please, please, this is my first official speech. One by one, please." said the professor in anxiousness of calming the throng of reporters.

As soon as he finished, a reporter raised his voice, "Sir, as the youngest professor in this room of age twenty-nine, are we meant to take your idea of reshaping an entire planet against all the experienced, world-renowned scientists in this room?" A short pause followed.

"This is merely an idea," he first stuttered, after several repetitions of the word idea bouncing across his mouth, he gained back certainty and continued "An idea with a vision. As a conjoint visionary and astronomer, having studied within the fields of ecology and astronomy my entire career, I believe this is the right direction for humanity."

"Optimistic words professor," began a senior professor, an internationally acclaimed leader in hydrology, "But I don't think that we can terraform a whole planet in such a short period. Every two years, a virus pandemic arises, but your claims of extricating humanity by terraforming a whole planet are unviable and impractical. Considering the option of 'creating' an ocean ceaselessly on a planet with such a thin atmosphere is unbelievable itself. Historically, Mars may have once contained microbiological life, having seen evidence for possible rivers and streams, but due to its thin atmosphere, it's all been evaporated. And now you pose the idea of thickening Mars' atmosphere? Impossible, given your time frame." Throughout the community of professors were nods and agreements.

“We’re currently working towards - ”, Professor Prekker began but was interrupted by another professor.

“You claim that terraforming Mars, giving it forests and oceans, will be achieved? As a geochemist, I do agree that Mars’ soil does have some nutrient properties to sustain crops, scientists are on Mars right now, fertilising the soil to make it suitable for growth. For decades, plant growth on Mars has only existed in labs. You claim your ‘idea’ will adjust the whole atmosphere of a planet, without any research?”, rebuked another scientist, a pioneer in his field. Once again, another wave of approvals as the reporters scrambled at their note pads.

“I do believe - ”, interrupted anew, but this time by a reporter.

“Sir, how do you feel about your vision, as an astronomer, being disregarded by all the fathers in their rights of the fields that you are seeking to break the barriers of each of them?”

Followed by this, questions came raining down upon the professor regarding his madness and inexperience, as he quickly descended the podium and exited the hall.

“News tonight, on the 29th of February 2050, Professor Prekker, astronomer and claimed visionary, has recruited five recent PhD graduates to tackle this endeavour. Here we are, one month after what meant to be a celebration to a discovery but had turned out to be ridiculed by world-renowned professors.” Reported co-host Sandra Biggens, 9news’ latest reporter. Behind her came up a replay of the barrage of questions and ridicules that were upon Professor Prekker as he descended from the stage.

Sandra continued, now with Professor Prekker, and his five recruited scientists, beside her.

“Welcome Professor, I see that you have recruited five bright young minds to collaborate with your

work. May I ask, is this in response to the derision the other professors displayed during your oration?”

He replied in his utmost confidence and sincerity, “Sandra, I truly believe in my vision and the hope that humanity still has on Mars, and after that surmise, I realised that I was after the wrong audience. The men I spoke to last month had hitherto fixated ideas through years of accumulated experience and relationships, but these young men and women are here to revolutionise as they come in with a fresh perspective, leaving a wide door open for achievement. Here beside me, stands Abby Mckinney, a PhD graduate from Melbourne, Australia, one of the top graduates in oceanography. Kaden Cirillo, a PhD graduate from Greece, top in Europe in meteorology. Isabel Chu, our youngest PhD graduate in geochemistry, having just graduated, Isabel comes in the top for her field in America, both North and South. Anthony Shaw, a PhD graduate in ecology, who throughout his academic years, has working experience with one of the biggest conservational groups on Earth. And last but not least, Christopher Chen, a PhD graduate from Singapore, the very top in molecular biology. These five before me are the cream of the crop in their fields and with the collaborative values and their young, fresh and innovative mentalities will framework the completion of a momentous task. The collaboration between the studies of Earth’s four spheres, the lithosphere, hydrosphere, atmosphere and biosphere, will allow us to recreate a new world.”

“Sounds very promising Professor, even with the science community elucidating your vision as unachievable. But enough said I wish you the best of luck. Thank you for your time, and we’ll be back with more of the latest news. I am Sandra, see you after the break!”, as Sandra concluded, the professor and his team got back to his lab, beginning what they hoped to be a breakthrough no one else saw possible.

Professor Prekkers lab was nothing like they have seen before. It was a small lab with some of the most sought after equipment in the industry. It looked as if it were just newly built and furnished as not a trace of dust could be seen within the small warehouse where the lab occupied. Beside the entrance, was an open closet which hung six lab coats, each with its protective equipment.

“Don’t fuss, your PPE’s won’t be necessary now, please have a seat here.”, Professor Prekker said as he leads them to a room adjacent to the lab, surrounded with glass walls was a large office discussion desks with six chairs. He continued, “before we can get on to work, I will need to brief you about our current situation. In this room, we will have discussions and constant update as to our progress”, with excited looks across the board, he continued, “Pulling through from my parents and my bank accounts, this was the best we could do”, he felt a sudden wave of empathy by the group, “This is great professor, but what if we can’t do this, after all - ”, Abby was interrupted as the professor quickly spoke, “We won’t fail. Rather, we must not. My life savings has gone into this project, as well as my reputation. Additionally, humanity depends on scientists like us to lead them to a better future, who else better to do that than us? First things first, no failed mentalities, no giving up, and no hope lost, because we will do this. We are young, bright and innovative, all of us. And I’m not your senior, I’m barely three years older than most of you, so how about we ditch the titles, call me Robert. We must be close, closer than a team, and that’s how we will achieve success.”, now he captured their attention, inspired them a little too he felt. He continued, this time stepping in front of one of the eight large glass walls that surrounded this room, holding a marker drawing as he went, “Down to business. As you know, Earth is made up of four spheres, the hydrosphere, lithosphere, atmosphere and biosphere”, he explained, pointing at each one in their category, “Our job is to recreate Earth’s four spheres onto Mars. But like every success, there must be a special ingredient. Ours is this,”, he held up a vial with a white substance, “Vitalus. I’ve called upon your collaboration at a very early stage in my research, so my knowledge only extends up to

here. With our partnership, I hope we can discover more about this substance”. He continued, reexplaining his motives and intentions, and how Vitalus, with their research, could fix Mars.

“How much Vitalus are we limited to?” Posed Kaden.

“Thanks to our team, they’ve extracted 90% of Vitalus from the asteroid, giving us ample to work with.” Replied Robert calmly.

“What would happen if we integrated this substance into plants?”, asked Anthony.

“Please address the substance as Vitalus. But no, that hasn’t been tested. You have an idea?”, asked Robert.

“Well, if we could integrate it with plants, hopefully, it amplifies its ability to consume less carbon dioxide, and its ability to withstand Mars’ harsh environments.”, pondered Anthony.

“Yes! Now we’re thinking!” Robert said excitedly, scribbling the idea onto the glass.

With that, endless research and discussions held across three months. This led to the continuous discoveries and accomplishments made by the team. Successfully, having to create a small atmosphere, with viable soil and healthy fast-growing wheat thanks to Vitalus. Most notably, Professor Prekker’s work was highly intense. Within the lab, he was assisting where possible, learning from each specialist and bouncing ideas between them. Outside the lab, pressured in answering scientists, he was keeping Earth hopeful of their work. At their three month mark, they decided to retrieve additional samples from Mars for further testing.

“Team, our improved spaceship will now take us sixty days to Mars. Please pack your equipment and tests as we will be collecting more samples before our return.”, announced Professor Prekker.

Within days, they were in space.

They landed smoothly, with Professor Prekker mainly secluded, indicated the intensification of the pressure. The base camp on Mars was sponsored by the government, even while some scientists claimed it was a waste of money. They settled with an individual room for each and a lab with the latest devices. The unpacking stage ended in a matter of minutes as the devoted crew began their brief over the current situation and deadlines. Professor Prekker came into the room holding a cup of coffee, looking wearier than before, sweat trickled down his neck as his breath shortened after each intake. He hobbled to the board, missing his stepping.

“Professor, are you - ”, before Christopher could finish, the professor collapsed, crashing into the chair, cracking the mug as coffee soaked into his shirt.

“Doctor!” cried Abby.

They held a funeral the day after his heart attack. The team’s research had drastically slowed. Tensions were high, and moods were unexpected.

“Guys, we have a problem. The compound of plant cells and Vitalus works on Earth but not on Mars. The plants grown here have two significant problems. We can’t have a self-sustaining forest. We need to water them with our drinking water manually. The second issue is that the atmosphere is too thin and too much oxygen escapes, there is no way our hybrid trees can produce enough oxygen to create a new atmosphere.” Uttered Anthony defeatedly.

“We have another problem too.” Kaden spoke, sounding even more terrified than Anthony, “It’s news from the government. Conditions on Earth are disastrous, the virus has evolved at an accelerated rate, in addition to another rise of a mutated virus. There’s hardly any hope left on Earth, and after hearing of our discoveries, they have launched three spaceships towards Mars with 20% of

the only healthy people on Earth. That's twenty million people heading this way. And we only have two months until they get here."

"Where are they all going to live?" asked Isabel.

"Well..." Kaden never finished.

"No! Two months to form an atmosphere, terraform a planet and build homes for 20 million people?" Isabel cried.

A long wretched silence followed this. They sat around the same discussion table Professor Prekker had died. Still grieving upon his death, the thought of being incapable of finishing what they started lingered in their minds. Heads were tilted down, the feeling of defeat circled the room.

"We can't keep our heads down. Professor Prekker united us for something much bigger than ourselves. To save humanity. Right now we're humanity's last chance. Our success determines the future of humankind. If we don't pull ourselves together, let's just say goodbye to this project altogether", Christopher spoke, ending the sorrow silence.

"And so what do u suppose we do?", asked Anthony.

I have an idea", Christopher spoke.

"An idea? Better than nothing, I guess. What's the idea?" said Anthony.

"It just came to me, instead of focusing on trees and technology as we did on Earth, we use Vitalus on a type of microorganism. Historically speaking, cyanobacteria produced oxygen in our atmosphere", Christopher explained.

"That still doesn't solve our problem. It doesn't produce enough oxygen, too much escapes to form an atmosphere, and there's not enough time! It took cyanobacteria 300million years to produce enough oxygen for Earth to be habitable by other organisms." countered Anthony.

“First of all, Vitalus makes up for the lack of phosphate and nitrogen in Mars as, without any of these chemicals, the plants we grew back on Earth still maintained the small quality a tree should have with proper supplements of phosphate and nitrogen. So there isn’t much need for nitrogen-fixing bacteria or denitrifying bacteria as we don’t need the nitrogen cycle or the phosphate cycle. Besides, Vitalus’ effects on trees not only speed up their growth, furthermore reducing their intake. I don’t see why this wouldn’t work on another living organism. We will populate Mars with cyanobacteria to create a sustainable atmosphere. I also have another idea to reinforce this,” Christopher spoke rapidly, ideas forming within each second, “Isabel, you are the geochemist, how many volcanoes are dormant or active on Mars? And what are the gases they spew?”

“There are twenty dormant volcanoes, in addition to five giant shield volcanoes. None of them is extinct. They mainly emit carbon dioxide and hydrogen sulphide. ”, she replied instantly.

“Perfect. Here’s my idea, Isabel, erupt those volcanoes, they would spew out enormous amounts of gases, these gases would rise and be thick enough to trap the oxygen that the cyanobacteria are producing. Being mindful that cyanobacteria use photosynthesis to produce oxygen, this is where we start populating Mars with trees. Once the toxic gases have left the atmosphere, this is the risky part, if our research proves correct, injecting Vitalus into our system would allow us to inhale less oxygen. Allowing for our cyanobacteria and trees to continue producing oxygen while our twenty million, soon to be residents, wouldn’t slow the process down.” Expounded Christopher, panting, having elucidated everything in one breath.

“And, the hydrogen from the volcanic eruption would bond with the oxygen molecules, beginning our water cycle! Christopher, that’s genius!”, exclaimed Abby.

“And how do we contain the atmosphere? We know that Mars’ core is molten iron which means there is still a gravitational pull, but it is weak. It’ll only be a temporary solution as in 4.2 billion years it’ll be gone,” Kaden commented.

“Well, we have many years ahead of us. One problem at a time”, replied Anthony.

“So quite simply, we combine Vitalus into cyanobacteria, spread them across the globe, erupt all Mars’ volcanoes, begin the water cycle, plant trees all around Mars’, inject people with Vitalus, and that’s how we terraform a desolate planet into Earth’s back up in two months?”, Isabel summed up.

And that’s exactly what they did.

One month after the arrival, they congregated in the common square for their first gathering after an exhausting settling into their new environment.

“Good afternoon, Martians!”, boomed Christopher from the podium, waves of cheers and applause followed this. He continued, “Today we are celebrating the first month of our Martian life, the beginning of a new world. Beside me, stands my friends. Please give a round of applause to hydrologist Dr Abby Mckinney!”, stepping forth, she blew kisses to the crowd. “Meteorologist Dr Kaden Cirillo!”, waving his hands, Kaden saluted. “Geochemist Dr Isabel Chu!” Isabel stepped forth, curtsied, and waved to the crowd. “Ecologist Dr Anthony Shaw!”, hearing his name, he sent air high fives around. “And me, Dr Christopher Chen, a molecular biologist!”, screamed Christopher, pumping his fists. After settling the excited crowd, he continued, “This group of ours, couldn’t have been successful without our founder, Professor Robert Prekker, an astronomer and a visionary. Initially, we were afraid to move to Mars, to live isolated from home. But he reminded us that home wasn’t a place, it never was, he said that Mars could be home, home was whatever we made it off. Where we are doesn’t shape what becomes of us, it is us that shapes where we are. And for us, this is home. This was Professor Prekkers dream, and that shall never be forgotten. But, I also want to thank this amazing team. I’m speaking today, not because I’m the leader, no we are all

equal, it was because I drew the short straw,” this prompted some laughs from the audience, “I grew up during the worst hits of the pandemic, having my father pass away at the age of six and my mother just before I entered university. But here stands my new family, not just this team, but you and this planet. Mars is our newly born baby, still young and rapidly growing. Scientists are now working further on sustaining this planet. This is our second chance. With or without the virus, sooner or later, we would’ve left Earth, forests have become extinct. Toxins and pollutants have bioaccumulated in our fish, our pets and even in us, making our human race, far weaker than before. In addition to the growing populations, which majority are still relying on fossil fuels,” as he spoke, horrific images of Earth flashed across the screen, “I would like to bring your attention to a famous painting known as The Garden of Earthly Delights.” The painting appeared on the screen behind, “this painting has three panels, on the left it depicts a heaven-like world with only Adam and Eve, free of evil, free of pollution and free of man. In the second panel, we see man and nature together, in slightly worse condition than the first but no doubt a flourishing population of humans. In the third, is a hell-like environment, with the seven deadly sins roaming, a dystopian world. Currently, Mars depicts the first as Earth depicts the last. Sapiens has ruled the world because we can cooperate flexibly in large numbers, as shown in the second panel. As proof, we can point to the amazing achievements of our species, we built pyramids and the Great Pyramid of Giza, we deciphered the structure of atoms and brought extinct animals back to life, we have reached the south pole and travelled to the moon, and we have conquered Mars. In such little time, humanity has stretched itself so far, achieving the unthinkable every other day. Today, you stand on a milestone for humanity. Fire gave us strength. Boats helped us expand. Technology made us connected. And science has made us the strongest creatures on Earth. So please, this is our new world. A new start to billions of years of humanity. This is our second chance, so let’s do it right.”, he concluded, the sounds of cheers and applause blocked from his ears, staring at the first tree they grew, he whispered, “please give us another chance.”

