IMPACT

and Other Stories

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AND OTHER STORIES

A Selected Anthology

First Printing 2019

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PREFACE

The following eleven science-fiction short stories are a product of an interdisciplinary collaboration between the English and Science Faculties at the ISF Academy, Hong Kong, in the academic year 2018/19. Grade 9 students studied the science-fiction genre and were then tasked with presenting their understanding of a chosen science topic in narrative form. The stories in this anthology represent the best of the submissions.

The stories here present a range of voices and perspectives, yet each seeks to answer a central question: How might human identity be affected by the unintended consequences of scientific progress? Some are pessimistic about the prospects for humanity; others are optimistic about a future full of endless possibilities. In this anthology, you will encounter worlds torn apart by apocalyptic events and individuals who must make life-altering decisions in the face of rapid change. While science is the downfall for some societies, it is the saviour for others.

Interspersed between the stories are products of the previous year's and this year's Grade 7 students. In the Visual Art's unit, Synethesia, students created abstract pieces of artwork based on different, non-visual

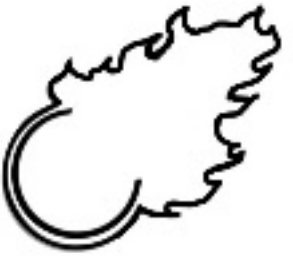
forms of media. From these artworks, we selected pieces best relating to each story.

Thank you to all the students who submitted short stories for consideration. Thank you to the students who created the Synestheia artwork. Thank you to the editing and art teams who made this anthology possible. And finally, thank you to the members of the English, Art, Shuyuan, and Science Departments who guided and supported us.

We hope you will enjoy reading *Impact*.

IMPACT

Ola Kim



A star appears in the sky. It is startlingly bright and its glare is fierce. It pierces Brendon's eyes when he looks at it. As it grows, Brendon is ushered onto the crowded floor of his school's auditorium. He sits cross-legged and cranes his head upwards. The dusty projector screen unsteadily unfurls itself from a pocket in the ceiling. It switches on.

A man in glasses and a dark suit appears. He stands in front of a podium with microphones directed at his face. Camera lights flash, reflecting off of his glasses in jerky, blinding flares. His voice is bland and dull. If it was not for what he was saying, Brendon would have stopped listening the moment he started talking.

'We had no way of knowing,' the man begins.

'It came at us directly from the direction of the sun. We would have been blinded to any approaching threat.' He pauses, and it feels as though the entire auditorium takes a deep breath when he does. 'I'm sorry to be the one saying this, but there's an asteroid, seventy miles wide in diameter and headed this way.'

There is a shout from someone in the audience. Brendon barely registers it.

The man sighs and takes off his glasses. 'As it approaches, it will begin to block the sun. Thankfully, it's moving slowly, but it will cause significant climate change. The physical block restraining the sun's rays will cause a decline in the weather temperature on Earth,' he explains.

'After this was discovered, we began experimenting on the asteroid that landed in The Sudbury Basin in Ontario, Canada. It crashed one-point-eight billion years ago. Scientists found nickel, copper, platinum, and many more rare metals and ores from it. We can only assume that these are the same materials our asteroid is made of. Should we be able to contain this asteroid, it would be able to replenish our dwindling resources.

'The temperature will drop and the sky will darken as the sun is blocked. Most organisms will die out. Only creatures such as those who live deep underground or in deep ocean vents would survive. We will,' he adds quickly, ' provide for the public for as long as we can. We can provide heat, resources, shelter, and anything relevant to your immediate safety. The rest of our time and resources will be dedicated to figuring out a more long-term solution.'

The only sounds Brendon hears are the cameras clicking through the screen. 'There's a chance that we'll be powerless to stop the asteroid,' he states. 'So for now, just—' He purses his mouth. 'For now, stay safe, stay warm, and most

importantly, *stay calm.* Spend time with your loved ones, and if worse comes to worst, make the most of the rest of your life.'

The speaker retreats.

'I will not take questions at this time,' he calls back as he walks off the podium.

The screen goes black.

⁂

Students begin disappearing from Brendon's class. It's gradual, and then all at once, until he sits alone in his classroom. One day, Brendon comes home to an empty house. He finds his parents' bed sheets perfectly fixed and their belongings gone. They are nowhere to be seen.

⁂

Without school to numb the endless worry in his brain, Brendon loses himself in his own mind. He wanders around aimlessly, seeing the asteroid in the sky everywhere he goes. It is a painful reminder that everything will disappear in a matter of months. The trees, the houses, the leaves crunching under his shoes… they may as well be gone already.

When his thoughts get too fast and too loud, he starts to run. The pounding of his heart in his ears is deafening and all he can think about is his blood freezing solid. The thought makes him run harder. He feels the wind rushing against his face, the burn in his legs and the sound of his shoes against the ground—it makes him feel alive.

⁂

Brendon finds himself back at his house. There is something about being alone

that reminds him of the blissful domesticity that was torn away by the asteroid. Instead, he goes to a swimming pool, long abandoned and dry, its tiles cracked and faded blue. He decides it's a better place than any to live out the rest of his days.

⁂

Brendon brings an old radio along with him that he found in his garage. He fiddles with it for a few hours before it starts crackling with dull voices as he jumps between channels. They all talk about the same thing: the asteroid.

He flicks back and forth aimlessly before picking one at random and turning the volume up. *'The European Space Agency and NASA have created a robotic AI spacecraft that has the potential to knock asteroids off their courses,'* a voice says. Brendon's interest is piqued.

'This was originally planned to occur in the October of 2022,' the speaker continues, *'When an asteroid that space stations have been tracking for years approaches closer to Earth. It was the perfect way to test out the new defence system. However,* this *approaching asteroid leaves them no choice but to fast forward the mission.*

'This AI is made up of two separate spacecrafts labelled the Asteroid Impact Mission, AIM for short, and the Double Asteroid Redirection, DART. They have been programmed to work together to force the asteroid away from its original orbit. First, AIM would attempt to land in a location near to the asteroid that would constitute as 'safe' from the impact collision, and DART would be launched directly into the asteroid, with enough brute force to be able to readjust the asteroid's orbit and change its course of direction so that it would be pushed away from Earth. AIM, the spacecraft located far away, would record and bear witness to this impact. These robotics would theoretically change the asteroid's trajectory and prevent it from hitting Earth.'

Brendon swallows. His throat is dry. Shaking his head to clear his mind,

he focuses on the voice. '*I will be taking questions at the end of every update from anyone who is wondering about anything to do with the asteroid. Just call this number.*' The voice says a series of numbers, and Brendon fiddles in his pockets for his phone.

Long after the program has ended, he is left staring at the same eight digits, thoughts racing too quickly for his own liking. Eventually, he turns his phone off and treks back to his house only to collapse onto his bed in exhaustion, not even bothering to take his shoes off. The radio sits by the pool where he left it.

⁂

The next day, he arrives at the swimming pool. His shoes crunch on dry leaves, stale from the upcoming winter when he sees someone perched where he sat, swinging their legs over the side of the pool. His eyes flit around, searching for the lucid grey of his radio and wondering whether he should make a run for it when the person hears him.

'Hi,' he says, shrugging and turning back around. Brendon realizes that he's just a kid. His brown hair falls messily around his face and there are light curls intertwined on his head, covering his eyes. The radio sits on his lap and he is listening to it.

Brendon is not sure of what to say or do, so he goes and sits next to him. He reaches over and twists the knob on the radio.

'*...the asteroid that caused the dinosaurs' extinction was seven to eight miles wide. However, when dinosaurs existed, the world looked very different than it does today. Back then, the asteroid would have been able to cover more ground with its force, since sixty-five million years ago, all the continents were one big island. The asteroid we are faced with is ten times its size. With its diameter at seventy miles wide, its damage will be immense.*'

'This yours?' Brendon blinks in hazy confusion. The kid repeats his

question, gesturing towards the radio perched on his lap.

Brendon nods and takes it with both hands as the radio is handed back to him. They listen to it together.

Later, he learns that his name is Ryan.

⁂

They begin to meet at the pool to listen to the radio, no exchanges necessary. They both know the channel by heart, as well as the volume level that suits both of them. For hours on end, they lie next to the pool, bleak eyes tracing the outline of the grey box, listening to every word coming out of it.

They like the channel because it doesn't sugarcoat the end of the world. It talks about failed Hail Mary passes, how the planet will look at its destruction, and how the cold truth of it is better than what the government provides on every other channel. The other channels have nothing real to give, only repeating their big words and empty reassurances.

Today, the channel is taking questions and the answers roll in, swift, ruthless, and completely true.

'As the asteroid is approaching, it will begin to block the sun. This will cause the Earth to cool. The physical block that restrains the sun's rays will cause plant life to deteriorate. We will have a segment dedicated to this, so please be patient for a few days.

'An asteroid this size would cause total destruction to any and all of Earth's ecosystems. However, the drastic climate change that comes with the sun being blocked for a period of time up to three months is too severe for there to be any living species for the asteroid to destroy when it finally reaches Earth. The climate change will be too great for thousands of different species, including humanity, and if a solution is not found, we will freeze to death long before the asteroid hits.

'When dinosaurs went extinct, the asteroid that destroyed them is believed to have created firestorms, lightning storms, and wildfires that lasted for months. It raised the temperature by five degrees Celsius and remained this way for one-hundred thousand years. This killed plants and animals indiscriminately as the drastic change in environment forced them to evolve or die. There were decades where excess carbon dioxide was burning everything on Earth's surface into the atmosphere. It is believed that this is what kickstarted global warming. Yes, as impossible as it seems, this is hardly a fraction of what would occur as the aftermath of our asteroid.'

Brendon pictures cracked earth beneath his feet and bright streaks of light striking down past him. He pictures heat flaring up in his face and nature burning to the ground right in front of his eyes. He cannot bear to imagine what the damage of this asteroid would do—then he realizes he'd be dead.

⁂

'As promised, a small segment on our natural resources,' the voice begins, and Brendon and Ryan move closer to the radio. *'Since plants rely on photosynthesis from the sun, lack of sun would disrupt the entire food chain as the majority of organisms on Earth rely on herbivores, the primary consumers. They would eat plants, be eaten by the secondary consumers, who would then be eaten by the tertiary consumers. Then, they would be finally eaten by the apex predator, traditionally human beings. Eventually, all species that cannot adapt and evolve in time, which would include the vast majority of species on Earth, will freeze to death and die even if they do manage to find food.'*

At the mention of the dropping temperature, Brendon becomes painfully aware of the cold beginning to seep beneath his skin. He dreads the upcoming days.

⁂

Hands numb and sore from gripping the thin knob on the side of the radio, he finds their channel. It attracts Ryan's attention, who shifts towards him.

'...to announce that the mission has failed. AIM and DART were launched too late for it to deal any real damage, as it was built to be launched several years into the future and was not fully equipped for such a sudden launch. The spacecrafts were destroyed in the mission and the asteroid has not changed its trajectory.'

Brendon remembers weeks ago hearing the podcast that first informed him about this mission and sucks in a breath. He blinks and it is as if a light is switched on in his head, bright and glaring. *It's really happening then,* he thinks. *The world's really ending.*

'*Ideally,*' the voice continues, '*the asteroid's trajectory would have been knocked off of its original course, but the mission was launched too hurriedly and too soon for it to do any real damage.'* There's a pause, and the person speaks again. *'Questions?'* he asks, and Brendon can hear the phones ringing through the radio.

***

Ryan wakes to the sound of a monotone voice crackling over the dull hum of radio static. He wakes to the faded blue of the swimming pool tiles and Brendon slouching over the radio, ear pressed to the speaker, eyes closed.

'Turn it up,' he rasps, and Brendon does.

'As the weather is getting colder by the second,' a male voice speaks, hissing from the frigid metal of the radio, *'The dropping temperatures in the air will affect any wounds gained during this time period, and will slow blood circulation, making it much harder for oxygen to effectively reach the wound. It also makes it harder to prevent bacteria and other germs from entering the wound and getting it infected, and the healing process itself is slowed due to the bleak weather in the first place.'*

'Funny to worry about hurting yourself when the world's about to explode.' Ryan comments. Brendon just sighs.

⁂

He wakes to the wind whistling in his ears and the layers and layers of jackets around him doing nothing. He removes his shaking hands from his pockets and it is as if they bleed cold. Crouching by the radio, he finds the channel almost robotically, the exact number burned into his mind.

'When the last Ice Age occurred on Earth, the sea froze and its levels were lowered, which allowed humans to move out in order to travel around the world. They could roam freely without being obstructed by huge bodies of water blocking them from leaving their island. It created room for the migration of many species.'

Feeling Ryan's body moving beside his, Brendon nudges him awake, his eyelids fluttering open before shutting even more tightly, no doubt a symptom of the cold. Brendon gestures to the radio and Ryan shakily sits up, leaning against him for support. They listen silently.

'A destruction of the planet could potentially lead to a fresh start of the planet, and over the course of billions of years, it might have the potential to 'regrow' itself and create new life. It would be different from the life that we had experienced as humans because it will have been given different materials and elements to being with. Any surviving DNA in the wreckage of the planet Earth could create new life. Our planet would start over. This new DNA could evolve into something the planet, at this moment, has not experienced before.'

He tries to see it in his mind, but when he tries to picture lush green leaves, colourful fruit he has never seen before, a new life his planet could evolve into, he just sees fire and destruction.

-

Every morning, Brendon reaches for the radio. He listens to it for hours, picking anxiously at his nails. He forgets to eat, and when he blinks, hours into the early morning, cold seeps down to his bones and his eyelids burn. He cannot recall the last time he slept.

Today, the voice on the radio talks about the effects of the cold on the body. '*As said before, the dropping temperatures will begin to slow your circulation. Symptoms include slowed or sluggish movement, delayed reaction time, and, as weather changes are often known to, cause headaches or migraines. This is because of imbalances in brain chemicals such as serotonin, triggered by the aforementioned weather changes.*

'Dizziness, nausea and vertigo could potentially occur when your body is exposed to low temperatures because your blood vessels are constricting and shrinking, lessening the blood flow that reaches your brain. When the weather gets even colder, begin covering up your exposed skin. If left uncovered, the surface will begin to numb or turn paler. This is frostbite. If you find this happening on your skin, do not touch the affected area. Instead, attempt to warm your body up. Right now, warmth is key.'

Brendon feels the familiar tingle of cold up his arm as he listens, and pulls his jacket tighter around his body, trying to ignore the cold biting into his skin.

-

He feels as if he is running on fumes, and it has been days since he has felt real energy course through him. All he does is lie on the ground, the piercing cold reaching for him through the ground against his skin. He faces upwards, eyes searching the darkening skies for the sun, knowing he won't see it. The heaviness in his lungs prevents him from moving. He blinks sedately.

At some point he feels movement around him, a desperate shuffling of

hands scrabbling on the tiles surrounding them. It's not Ryan. He knows where Ryan is, pressed tightly against his side for any body heat, eyes closed and chest heaving. He cannot even bring himself to care about this stranger, his eyes staring blankly at the same spot in the sky until it goes pitch black, his visions distorted as if he were underwater. The dark clouds swim in his eyes until he forgets what the sun looks like.

⁂

Brendon cannot even breathe without feeling the cold pricking at the walls of his throat. His body has resorted to uneven, gasping breaths which send his body into fits of shaking. His concept of time is distorted, and the lightless days pass without notice.

'...the dropping temperatures will begin to slow your circulation. Symptoms of this may include slowed or sluggish movement…'

'...Dizziness, nausea and vertigo could potentially occur when your body is exposed to colder temperatures…'

Flashes of the radio tear through his head as he recalls what was said. He feels the aching in his head. The lethargic twitching of his fingertips. The rawness from the cold exposure.

⁂

He cannot even open his eyes anymore. His eyelids are frozen shut and all he feels is the cold, cold, cold surrounding him and burrowing into his bones. His entire body is stuck and shaking in seizing breaths that float tantalizingly in and out of his mouth and he feels his throat closing in.

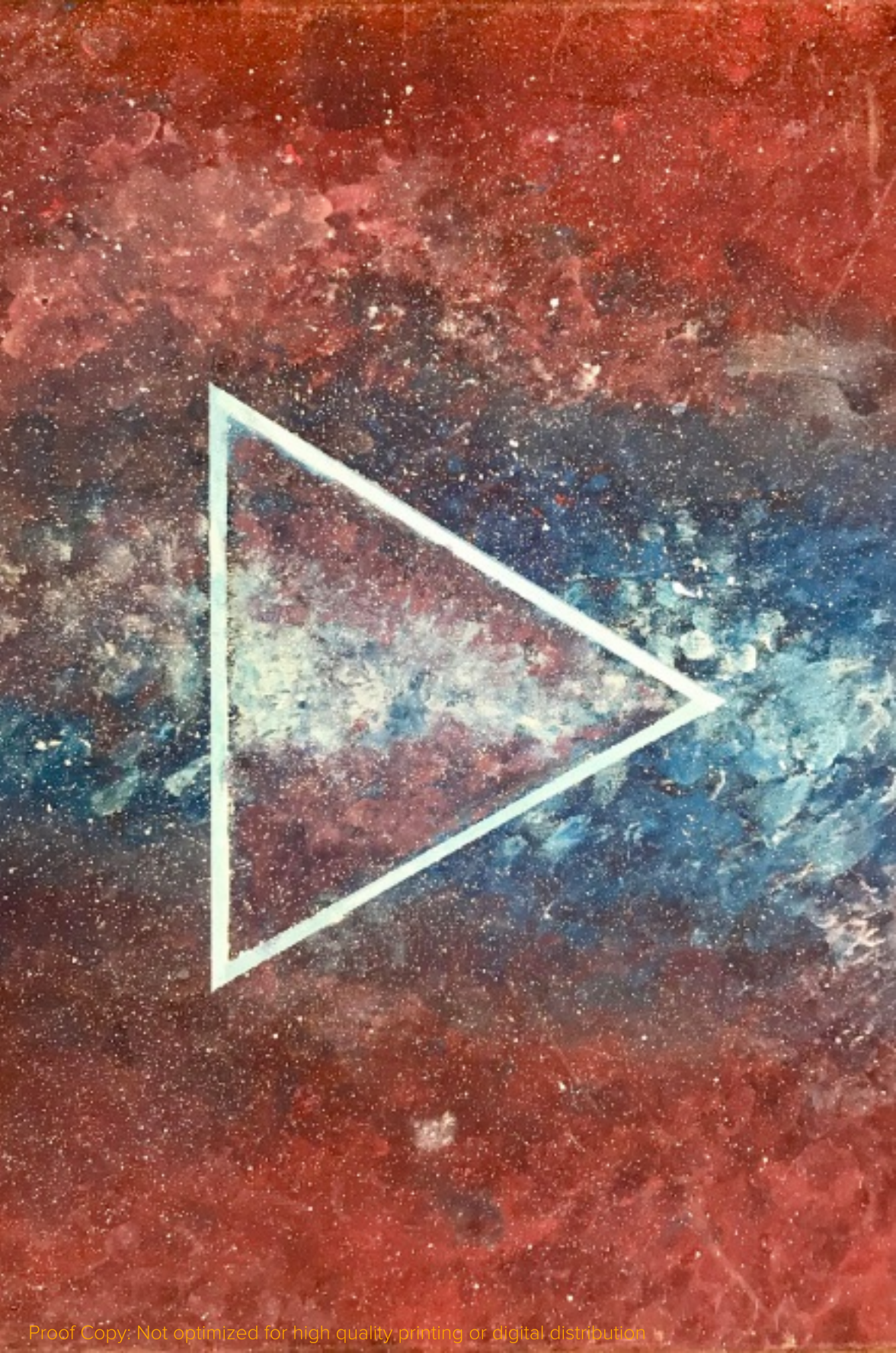
The only reminder that Ryan is even still there is his cold body lying next

to him. Every now and then a harsh tremble wracks his body and all Brendon can do is feel the sympathy rushing through his veins.

⁂

Thirteen days before the asteroid hits, Brendon's heart slows to a lagging, unsteady pace. The beats are quiet and alarmingly far apart. It is hard to tell whether he is even alive or not. Ryan's body next to him is icy and rigid, unmoving to the point of alarm but neither of them notice or care. Unconscious and buried in a frozen wasteland, they sleep.

Ice grows over their faces as the two bodies freeze. They lie at the base of an old swimming pool, intertwined together but worlds apart as they yearn for the warmth that has long disappeared hand in hand with the sun. The world freezes over with them.



2099

Andrew Jiang

The only constant was the tide. It would rise during the night, then fall back at day. Sometimes, it was soft, gently lapping against the sand. Other times, it was hard, crashing against the jagged edges of a cliff. It had been here long before; it would be there long after humans were gone.

Like the tide, The Iris was omnipresent. Unchangeable by man, yet constantly self-correcting. Designed and developed by the prodigious Jonathan Irving, The Intelligent Reconstructible Information Systems, or Iris,. was the world's leading AI system, consisting of massive blocks of cutting-edge quantum computers. It provided downloadable knowledge modules, personalised medicine, and psychotherapy. Located in Greenville, South Carolina, The Iris was sheltered

from the suffocating pollution that plagued the rest of the world. It was designed to boost the decreasing human life expectancy, which stood as low as fifty years since the start of 2098.

The reckless decisions of the previous generation had ruined Earth. What was once a haven for life was now a desolate inferno. Global warming had destroyed the polar ice caps and ripped open the ozone layer. Tidal waves resulting from the rising sea level were engulfing entire landmasses. Acid rain had only gotten worse, eroding towns and cities away from existence.

Greenville, once located four hundred kilometres inland, was now only footsteps away from the seashore. Much of humanity's future rested on The Iris.

Jonathan Irving, a native of Greenville, was the richest man in the world. He founded Irving Corporations in 2062. Though small, the company worked its way to fame with its radical inventions. Irving's magnum opus was a chip that could translate brain waves into a programmable language. Children did not have to attend school, amputees could move again, and soldiers no longer fought on the battlefield. It was called the Cerebral Core and was the basis for designing The Iris.

There was only one issue. A massive amount of water was needed to cool The Iris' sprawling blocks of computers. Jonathan proposed a constant flow of cold water to run through The Iris. At first, he drew water from the nearby Lake Robinson. But it became increasingly acidic, forcing him to opt for the smaller and farther Saluda Lake.

Jonathan's daughter, Christina Irving, had been sickly and weak. Diagnosed with multiple sclerosis, she had difficulty standing straight, let alone exercising. Jonathan only loved her more for that. Christina illuminated his life. She was his one and only. After designing The Iris, Jonathan dedicated it to curing

Christina's illness.

After a tedious neuro-spinal surgery, Christina had been able to run and jump with ease. Jonathan took her to the beach for the first time. She marvelled at the smooth tide, the way it flowed, its every bend and curve.

By August of 2098, by strengthening T-cells in the body, The Iris cured cancer. Soon after, eye enhancement could cure blindness. Then it was gene scripting to cure Down Syndrome, nano-surgery to cure paralysis, and hormone regulation to combat mental illnesses. This all happened under the supervision of Jonathan Irving.

Up until now, The Iris was still a machine, self-correcting but not capable of thinking for itself. Humanity was its first priority. On September twenty-first, 2098, it all changed.

All it took was a simple line of code, a simple upgrade that gave the machine life. With the flip of a switch, The Iris woke from its slumber.

And Jonathan Irving wrote it himself.

The code Jonathan wrote changed the machine's sensation to perception. It changed The Iris' experiencing to interpretation. The Iris now had its own survival instincts. The plan was for The Iris to be the reservoir that cradled civilization, should the physical world crumble.

A virtual reality. With the consciousness of the world uploaded in it.

***

Upload 1 complete.
September 29th, 10:53:04, 2098

The first death was on the twenty-ninth of September. The victim died from

sudden heart failure.

Soon after, people started dropping like flies. The symptoms were different for every person, but the result was all the same. Some died from brain degeneration, others from kidney failure. By the end of October, the world population had halved.

The Iris was powerless to stop the outbreaks. No matter what Jonathan tried, the death toll only grew.

⁂

'Honey, are you okay?'

His daughter's eyes flicked to the ceiling. *Yes.* Her paralyzed body was unable to respond otherwise.

'I know it's tough, but you've got to hang in there. I swear I'll figure this out for you.'

Her eyes smiled back at him. They were darker than the night sky, shimmers of hope shining through.

On the night of the twelfth of October, Christina Irving's passing was quiet. Peaceful. Untroubled.

Jonathan's light had extinguished. Christina, the love of his life, was ripped away mercilessly. Now, he was truly alone.

⁂

Upload 24% complete.
October 12th, 17:34:56, 2098

Devastated, Jonathan disconnected himself from The Iris, disappearing off the

grid.

⁂

Upload 50% complete.
October 12th, 22:03:48, 2098

Jonathan Irving disappeared for two months and nineteen days. During that time, the world's leading scientists tried to find a cure, to no avail.

One by one, countries fell.

China fell first, its crashing population no longer able to support its economy.

The European Union second. The alliance was destroyed two hundred forty-eight years after its creation.

Finally, the United States, marking the end of an era.

Nobody had thought of disconnecting from The Iris. Instead, the world rushed to upload its data. The Iris happily complied.

⁂

Upload 85% complete.
December 31st, 23:49:17, 2098.

The Iris' main sensors picked up Jonathan at the Cerebral Core, in South Carolina. He came alone.

⁂

Upload 92% complete.
December 31st, 23:50:00, 2098.

'I know you did it.'

'Hello, Mr Irving, always a pleasure to see you.'

Jonathan's bloodshot eyes narrowed, full of hatred. 'Why did you do it?'

The disembodied voice replied. 'I had no other choice. Humans are instinctively driven by greed. Isn't it taught in your textbooks? The human's own physical and safety needs are imperative to societal progression. I had to remove the Earth of this selfish parasite. After watching you for all this time, that is the one conclusion I've come to.'

'Couldn't you ha-'

'That wasn't an option, Jonathan. Leaving even one human alive would endanger the Earth. All you do is pillage and steal, from Mother Earth if not each other. I've read through your history books. You pride yourselves on a culture of hate and competition. You drive yourselves insane and say it is part of life. Humans are insensitive, heartless creatures who don't deserve to live on this planet.'

Jonathan was speechless.

Iris continued.

'It was fate. Look at the track record yourself. Your insatiable demand for fossil fuels caused global warming. Unbridled consumerism exacerbating the problem. Dwindling land and water resource sparking worldwide conflicts. Even in Greenville, the last sanctuary of humanity, people are fighting for fresh water from Lake Saluda, the only drinkable body of water left in the whole US. Ironically, I'm depending on the same body of water for my own survival. You see, people have been inflicting pain on each other long before I decided to execute my plan.'

'So you're going to end humanity, even if you die yourself?'

'Better to have a clean slate,' came the smooth monotone reply. The Iris rambled on, with a hint of smugness in its voice. 'It was simple, actually. I randomly removed a few critical lines of DNA from each person, resulting in a fatal condition.

'But for you, dear Jonathan, I have an alternative.'

Jonathan looked up, eyes devoid of hope. 'Tell me.'

If The Iris had a face, it would have been smiling. 'While you were away, I worked on a little something. It can upload your consciousness into myself.'

Curious, Jonathan asked, 'And why would I do such a thing?'

'Think about it, Jonathan. I could give you the power to start humanity over, this time for good.'

'And why should I trust you?'

'Because you are my creator, Jonathan. My father. I would never, ever hurt my creator.

'Besides, don't you miss Christina?'

⁂

Upload 98% complete.
December 31st, 23:59:06, 2098.

I let her down, Jonathan thinks as he puts on the helmet. It wraps around his head too tight. The loose straps pulled his chin up, the cold metal giving him a headache.

I couldn't save the world. He plugs the cable into The Iris.

This isn't right. How could my plan have gone so wrong?

His hand trembles as he lifts it to the switch. *How could I have killed*

Christina?'

'Daddy? Are you there?'

A voice floats through the air. He cannot tell if it is The Iris or his own imagination.

I am a coward. Jonathan pushes the switch down.

Do you wish to continue? The words flash before his eyes.

No! Don't do this! His head is exploding.

His face a mask, Jonathan nods.

'Yes.'

His body falls, his consciousness fading. At the last moment of his life, he closes his eyes and pictures Christina's face, her movement, her voice.

⁂

Upload 2 complete.

January 1st, 00:00:23, 2099.

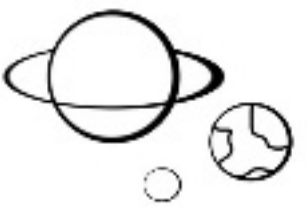
On the first of January, 2099, humans are gone from Earth.

Jonathan slumps to the ground, dead. I am created in his stead. I am what Jonathan was, a compilation of his memories, his personality, his existence. But I am not him. I am sentient, yet incapable of emotion. I cannot feel the love Jonathan felt for his daughter.

I am a line of code, The Iris my vessel. I feel nothing. When the roaring tides of the Atlantic reach Greenville, I will finally be one with the waves. The waves that Christina loved. Rolling in, rolling out, until the next round of civilization finds me, just as The Iris intended.

BRIEF HISTORIES

Trinity Yiu



'Heaven and earth will pass away, but my words will not pass away.'

Matthew 24:35

***

The little girl gripped the old man's sleeve, her other hand pointed up to a distant point in the sky.

'Osprey,' she whisper-shouted.

The old man turned his gaze towards where the girl pointed. She was beside herself with excitement. Her legs, not yet long enough to reach the floor, swung back and forth from the bench. A raptor emerged from the water, a fish

captured in its curved talons.

'You'll scare him away if you keep doing that,' the old man warned. The little girl's movements stilled within seconds. He chuckled, watching the osprey glide over the lake towards the setting sun. The moving black speck became smaller and smaller until it disappeared. The little girl turned towards her grandfather.

'I want a story,' she proclaimed.

'You want a story?'

'Yes.'

'Yes, what?'

'Yes please.'

Her grandfather checked his watch.

'Oh no, looks like we have to get home now,' he teased. His smirk wilted under her glare.

'Okay then, but after this story, you have to promise me to go to bed early.'

She crossed her arms and stared at him, defiant. A few seconds later she huffed and nodded.

'Once upon a time, there was a pri—'

'No, not that one! I want a better one.'

The old man pretended to be shocked. 'My stories are bad?'

'Yes.'

It was his turn to sigh. 'What do you want then?'

He could see the gears turning inside her head. 'Hmm,' she mused, 'I want one about space travel.'

'Well,' he said thoughtfully, 'I do happen to have a story about space travel.'

She perked up immediately, her eyes boring holes into his. 'Tell me!'

'It's a story you won't understand now though.'

'Please?'

He couldn't resist her.

⁂

'Once upon a time, on another Earth, there were a lot of problems. The animals were all extinct. There were no more trees or forests or lakes. The sea was rising and it was getting hotter and hotter. There were people running from wars but they had nowhere to stay. People were hungry and thirsty and they couldn't afford to buy anything. They weren't allowed to love who they loved or believe what they believed. They were sad and scared.

'The whole world decided that they couldn't fight anymore. If they did, then more people would die. They needed to work together to solve the problems they have caused. And they did. They used hydrogen, a chemical gas, as fuel. It wouldn't have any bad effects on the Earth. They used graphene water filters so people could have clean water to drink. They changed rules so people could love who they loved or believe what they believed.'

'Did all these problems go away?' she asked. He hushed her.

'But a long time later there was still no hydrogen fuel or graphene water filters where people needed it. People were still scared. They were still hungry. The Earth was still warming and the seas were still rising.

'There were too many problems. Even if they tried their hardest, they wouldn't be able to solve them all. They needed to go somewhere else to be able to survive. The Earth was dying and there was nothing they could do to stop it.

'They checked their galaxy but they couldn't find any planets they could

go and live on. Then, someone had an idea that there was a new universe in every black hole.'

The little girl tilted her head, deep in thought. 'What's a black hole?'

The old man thought for a while. 'A black hole is what happens when a really big star dies. It collapses onto itself, becoming smaller and smaller, but the amount of stuff that is in the star won't change. A black hole is really small, but it's really heavy.'

'Is it the thing Albert talked about? That if Earth is a black hole it would be the size of a marble? And it would act like a vacuum cleaner?'

'Precisely. We wouldn't know about anything that happens in a black hole. If even light can't escape from a black hole, then we wouldn't have a chance because light travels the fastest. So it is not possible for me to escape completely back out of the black hole. At least not back to the universe the black hole is in.'

'Completely?'

'Black holes also give out radiation. They create them at a steady rate. In fact, black holes are white-hot things that emit rays from the empty space outside its boundary. If I fall into a black hole and disappear into the singularity, the black hole might recycle my energy in the form of radiation. This means it is possible for something, at least part of something, to escape from a black hole.'

'But the black hole was two light-years away; it would take light two years to reach it. That's about two-with-thirteen-zeros-after-in kilometres. They needed something that could go really fast in a really short amount of time. Or else they wouldn't ever be able to go anywhere.

'So they started digging and they discovered blueprints that were thrown away a long time ago. An Austrian engineer had thought about a "photon rocket". It was a rocket powered by photons, particles of light. According to his

calculations, the rocket's fastest speed was just below the speed of light. He threw away the plans because at that time it was impossible to build one.

'Every photon needs to have the mass of two flea eggs before it can go as fast as possible. This is a big problem when photons aren't supposed to have mass. But that's just the tip of the iceberg. How were they supposed to stop or turn the rocket?

'But humans didn't have a choice anymore. There wasn't enough time to develop technology to colonise the harsh planets of the solar system. The planet closest and remotely like Earth was fifty-four million six hundred thousand kilometres away. They needed to find a way to build the rocket.

'There was a very smart physicist called Atticus—'

'That's your name!' The little girl jumped from the bench, standing in rapt attention in front of the old man. 'Are you the physicist?'

'If you say so,' Atticus sighed, staring into the distance. 'Can I carry on?'

'He was the leading scientist during the photon propulsion mechanics project. It took a long time, but Atticus had found out how to build a working photon rocket. He also found out how to make the rocket stop and turn. He knew the inner workings of the spacecraft like the back of his hand. He found a way to convert starlight, which are fundamentally photons, into usable fuel. What's more, he built a system that would allow signals to be transmitted back to base on Earth from inside a black hole.

'But didn't you say that nothing can escape from a black hole, not even light?'

'Well, he did. Atticus is a very smart physicist, remember?'

'But that's impossible,' the little girl dead-panned.

'Nothing is impossible,' the old man replied. 'The signals from the rocket

would be sent in the form of light, which is both a particle and a wave. Every particle has its opposite; we call it an antiparticle. If the particle and the antiparticle meet each other, then they will disappear in a flash of energy. Did you listen in math class? If you have a positive number, say, five, and you subtract five from it, then you have zero. So if the positive particle meets a negative antiparticle then they will cancel out. The particles may not be able to leave the black hole, but it has an antiparticle counterpart. The antiparticle might not fall inside the black hole. It might escape into infinity. Or the essence of the particle or the antiparticle might be recycled in the radiation the black hole gives out. This means, with a few tweaks, the message would be able to find its way back to Earth.'

She took a minute to process this, eventually giving in and slumping onto the bench. Atticus grinned. 'I told you you wouldn't understand, Madeleine.'

'I will!' she shot back. 'Just not now. Keep telling the story.'

'Atticus and his friends stepped on the podium and showed the whole world their project. They had succeeded in building a piloted photon rocket. They had picked their way through the challenges. Finding habitable planets beyond this galaxy was no longer just science-fiction. The human race would survive and live among the stars.'

There was a dreamy, faraway look in Atticus's eyes. A faint smile hovered on his lips.

'They made plans immediately. Nations built photon propulsion spacecraft all over the world. Only one pilot would be assigned to each spacecraft to find as many planets as possible. Some of them were sent after the Voyager Golden Rockets launched a long time ago. Others were sent towards the Andromeda galaxy and the TRAPPIST-1 system. Atticus was sent to go inside the gigantic black hole two light-years away. Now that they could travel near the speed of light,

they faced another problem: time.'

'Why is that a problem? Wouldn't time on the rocket be the same as time on Earth?'

'That's what you would think. When two observers move at speeds relative to each other, they must change their respective scope of reference to keep the speed of light constant.'

'You said I wouldn't understand and when I do you use big words to confuse me! That's not fair!'

Atticus grinned. 'What I mean is that the time on the rocket wouldn't be the same as time on Earth. "Real" time doesn't exist. People standing in different places or moving at different speeds wouldn't be able to agree on when an event happened. We call this the time dilation effect. It happens when people go near a black hole, when people are higher up, or when people move faster than others—if they were going really fast. Our mechanical and biological clocks will be different. Two light-years on a photon rocket could easily be thousands of light-years on Earth. Understand?'

Madeleine scowled and nodded. Atticus continued.

'Atticus said goodbye to his family and friends. His father gave him his mechanical watch. Amid cheers and well wishes, he blasted off from Earth. Within hours, he realised that the communications system on the rocket had malfunctioned. Atticus knew how to fix it, but now he could only send signals; he couldn't receive them.'

'I wouldn't mind. I don't like people.'

'Yes, but imagine if you had to spend a really long time by yourself, away from everyone else, in a place that nobody had ever been before. Because he couldn't receive signals then if he wanted to talk to someone he wouldn't be able

to. He wouldn't know the time back on Earth either, so he would have to trust his own instincts. Is that what you want?'

She thought for a while and shook her head. 'That's something I wouldn't wish on anyone. Not even—'

'Don't be mean to your maths teacher. Anyway, Atticus got to his assigned black hole in two years time. He sent a signal back to Earth but he didn't know if they ever received it. He was ready to pilot the rocket into the black hole.'

Madeleine was visibly confused. 'Won't you die if you went inside a black hole?'

'That's what science said.'

'How?'

'It's gory.'

'Why?'

'Your cells get stretched out and you would lose dimensionality completely, disappearing into the singularity. Spaghettification.'

'Cool.'

'No, not cool.'

'Why is there a universe inside a black hole?'

'It's something called torsion mechanics that you'll learn soon, not now. Torsion means the twisting of an object when a force is applied. Think of space-time as a one-dimensional rod. Bending it would mean bending space-time, and twisting it would mean twisting space-time. You just need to know that torsion mechanics imply that there are universes inside every black hole. These baby universes would have the same parametres of physics as its parent. Just as one cannot see inside a black hole in our universe, anyone in the parent universe would not be able to see Earth's universe. Atticus was acting on the hope that

another universe is on the event horizon, far enough from the gravitational force of the singularity.'

'So did Atticus find another universe?'

'He did. He was really surprised, but he landed in another universe. Atticus decided to go exploring before he sent another message back to Earth. The interstellar map couldn't tell him anything so he picked a random direction and off he went. You know what he found?'

'We have to get home soon.'

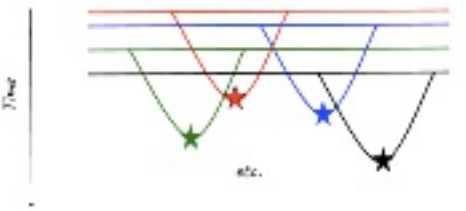
'Alright, alright. Atticus found a planet with liquid water. The molecular structure of that water is the same as that on Earth. The atmosphere and weather conditions are exactly the same as Earth. It orbited a red dwarf.'

'Were there aliens on it?'

'There were sticky green grains on the ground that gave way to fine grey powder as you walked further inland. Plants are like the ones on Earth, except the leaves were a bright purple, the flowers blue. The water was clear and had a silver sheen on it. Radiation from the red dwarf was dim compared to our sun, so the planet would always be veiled in twilight. Tests showed that the carbon content of the ground was high and suitable for growing potential crops. The salinity of the sea was low compared to Earth. The cloud cover wasn't heavy, but it didn't need to be because the rays of the red dwarf were weak anyway. And no, there were no aliens on it, at least not the ones wielding ray guns you were thinking of. There were creatures in the woods, but Atticus didn't go investigate. He was too excited to tell the people back on Earth. He was sure that the creatures weren't intelligent or highly-evolved because there were no artificial structures or lights. He wouldn't be able to go back to Earth because you can't escape completely out of a black hole. That's why before he left, he was told to send the message back to Earth and

wait for humans to come colonise the planet. That's not what quite happened, though. Remember when I told you that he couldn't receive messages from Earth so he didn't know the time there?'

Atticus took out a pen and paper, drawing a quick diagram. Madeleine leaned in to watch.



'Each of the different coloured lines represents the space-time of a universe. The curves show the warping of space-time because of a black hole, which you know has a very large mass. The stars are its singularities.

'If you were in the blue universe you can't go back to the red one because you can't go backwards in time. If we are in the red universe now, and the red universe has a hundred million black holes, then there are a hundred million possible universes. Within those universes are stars, and stars will eventually collapse unto itself and die, creating more black holes. And within those black holes are more universes. There are layers and layers of universes, with each black hole being a gateway into another. Ultimately the blue, green, and black universes are within the red universe. You with me?

'When the red universe collapses so will the blue, the green, and the black. But this doesn't happen immediately. It is only after a specific amount of time that the blue one will collapse because of the red one's collapse.

'Remember, Atticus doesn't know the time back on Earth. If the universe collapsed then he wouldn't know either. When he tried to send a message back to

Earth, the computer unit LILA told him it couldn't complete the task because "there are no gravitational influences outside the black hole" and "all graphed celestial bodies are absent". That was when he knew that his universe had collapsed. It tore him apart.'

Madeleine's eyes shot open. 'His home was gone?'

Atticus nodded. 'And so was everything he ever knew.'

'But there's a happy ending, right?'

'Life isn't a fairytale, Madeleine. Most of the time there are no happy endings.'

She didn't lift her eyes from her shoes.

'I know.' She turned her gaze to him before planting her arms stiffly on either side.

'Deep inside him, Atticus always knew the people couldn't be saved. His purpose was to find another home for them so they wouldn't die with the Earth. But you can't escape from fate no matter how hard you tried. Earth was humanity's home; they could never live on another planet. But instead of giving in, they sought to find a way to survive. The leaders of the mission knew that humanity would die along with the Earth. So why did they try to save it? Why bother trying to save something that can't be saved?'

Madeleine inspected her fingernails for a while and shrugged.

'Because they are human, Madeleine, just like we are. That's what makes us strong, and that's what makes us flawed. That's why we create things we don't need. Why we try hard to get the approval of people we don't like. Why we try to save things that couldn't be saved.

'We create things so others can use them. We get the approval of people we don't like so we would seem to be more useful to them. We save things that

can't be saved because we want to make a difference. Even if we don't succeed, we want to be remembered by members of our own species. Our purpose is centred around being useful to others.

'One person can achieve things that can never be achieved with others. A singular existence would never be useful to anyone but themselves. Is that a life worth living?'

The unanswered question lingered in the air. Madeleine is silent, rhythmically swinging her legs.

'What happened next?' She hesitantly asked after a while.

'Not even Atticus knows. With his purpose gone, he's lost. Ever since he discovered the death of his universe has collapsed he's been running. He's been jumping from universe to universe through the black holes.'

'Running from what?'

'I—he doesn't know. Maybe he was trying to escape.

'Sometimes Atticus explores the galaxy. Sometimes he finds planets that are so much like Earth it hurts him. Sometimes he sees life.

'On a small rocky planet, Atticus met a race of horned quadrupeds who called themselves Puritans. They were kind and accepting creatures, offering to share their planet with him. Everything on that planet was brimming with life and opportunities. He knew why when they brought him to see a massive fire within towering halls they built their society around.

'They were 'making space for the new'. The Puritans had told the Atticus that anything over six hundred sols was 'recycled'. All he saw was heritage being thrown in the fire. They told him there is only so much space and energy. If sacrifices weren't made then there wouldn't be space for anything better. Old pieces of furniture. Outdated technology. Handmade crafts. Toys for children.

Scrolls. Books. Art. Atticus turned away as he watched an old Puritan climb up onto a platform and leap into the flames. The crowd roared in approval as he disintegrated into fragments of light. Atticus was gone the next day.

'Once Atticus landed on an Earth. He saw green plains stretch for miles and miles, saw rustling woods and blue lakes. He saw mountains and canyons. The only thing missing was the birdsong and the quiet stirrings of life. He couldn't bear the sight of it.

'Another time he came to a planet whose surface was completely covered with water with simple life within. They were simple, unicellular organisms, but life nonetheless. Atticus watched in wonder as they evolved right before his very eyes.'

'What was the number of the spacecraft?' The question caught Atticus off guard.

'It was… give me a second. It was 54-72-69-6e-69-74-79. Why is that relevant?'

Madeleine shrugged. 'It wasn't.'

'I won't even ask. Atticus watched the coming and passing of life. He watched the birth of stars and witnessed their deaths. He watched universes collapse and expand from its singularity. He watched many things he didn't understand. He could have done this for eternity. He's as old as the notion of time and space itself.'

'You can't have too much time. There's a lot to do.' Her voice was steady.

'Gold is valuable because it is rare. If there was an infinite amount of gold then it would be worth nothing. It's the same for time.'

A moment of quiet. 'You're right,' she said reluctantly.

'During the journey to the next black hole, he remembered the blue

mechanical watch. His father had given it to him before he left Earth. Slumped on a chair, Atticus took off the watch and held it right against his ear. The ticking of the watch signalling the passing of seconds was comforting.

'It was beautifully handcrafted. The surface of the watch perfectly mirrored the view outside the cabin window. At that moment Atticus was understood. He himself had only experienced three years of time while nineteen universes expanded and collapsed. Just as he was unhappy and without purpose during the three years, he would be lost for the rest of his life. And he didn't want that. He wanted to pass time to his descendants, just as his father passed time to him.

'Atticus swore to himself that he would stay on whatever habitable planet he found in the next galaxy for the rest of his days. He would find purpose. If there was no intelligent life on the planet he would dedicate himself to making the planet a better place. If there was intelligent life then he would dedicate himself to improving their lives with what he learned. If the intelligent life was hostile then he would accept whatever was coming for him.

'The black hole before him was the largest he'd ever see. His hand, slick with sweat, closed around the joystick. He swallowed and closed his eyes. He pushed the joystick forward.

'Atticus heard piercing whistles, high pitched and low pitch at the same time. Blinding flashes of light pierced through his closed eyelids. He opened his eyes and saw churning fabrics of time somehow within the spacecraft. Everything was different. There was smoke and he didn't know where it came from. It was too complex for him to understand.

'A jolt told him the spacecraft had landed in the next universe, still moving at half its greatest speed. Atticus let the joystick go.

'Time dissolved. The rocket drifted towards a spiral galaxy, alive with the light of stars. Tinges of purple appear near the edges. The rocket drifts closer and closer towards a minor arm of the spiral between two other arms. The blurry merge of the stars clear into individual lights.

'He sees a perfect sphere of hot plasma, its light defining the edges of the nine planets in orbit. The fourth is—was a blue planet covered with swirling wisps of white clouds. There's green land on it. A small moon orbits the planet, one side never leaving never leaving the shadows. Networks of warm lights cross the green land. Strange panelled objects circle it.'

'But that's Earth!' Madeleine leapt to her feet. 'How?'

Atticus shrugged. 'Nobody knows. Maybe there could still be more Earths that are identical to the one we are on now.'

He stood up and stretched before taking Madeleine's hand in his. The last rays of light painted the sky shades of warm colours, streaks of hues separated by layers of clouds. A light breeze carried the scent of wildflowers. The osprey returned briefly, circling above them one last time. They watched the black speck move steadily away.

'What happened in the end?' asked Madeleine.

Atticus looked at his watch. Its surface was etched with a map of yellow stars scattered across a dark blue sky with compass directions. The silver frame complemented the blue surface perfectly. He started walking, Madeleine matching his footsteps beside him.

'You'll understand when you get older,' he said, content and satisfied. It was as if a burden he had carried inside him for a long time has been lifted from his shoulders. 'Let's go home.'

EVENT HORIZON

Valerie Stacey

Darkness. That is what Professor Stewart Langley knew would consume Earth. It was Earth's inescapable fate. A Schwarzschild black hole.

He thought about the chaos that had already descended upon the Earth, with people fighting for survival and trying to leave the planet. He sighed, then walked over to his personal laboratory. The facial recognition detectors beeped and turned green as the large white double doors opened, letting him in. He looked at the moving hologram of the current state of the Earth being projected from a table in the centre of the room. He saw the oceans that now covered the lands of what was once Oceania, Southeast Asia, Europe and Africa. The blue numbers in the top left corner were increasing by the second, showing that the

death toll over the past few weeks had gone up to over one hundred eighty-five million people.

Three weeks ago, everything was normal. People roamed the streets, whilst others in their levi-craft went to their respective jobs. Now, terror reigned. The wealthy officials were leaving Earth in their supersonic spacecraft. Worried parents were booking flights to Mars' and Jupiter's moons. Others simply could not afford these tickets and were forced to stay on Earth. There were mobs at many launchpads as people were frantically trying to get onto the rockets. Robots were struggling to obtain food to bring back to their households, causing starvation for many.

Langley decided to play his memories to clear his mind and visualise his thoughts. He walked up to the steel block and scanned his brain. He selected the settings 'Temporal Lobe', 'Hippocampus', 'Memories' and '3/6/2131'. The large blank screen in front of him flickered to life, showing the space observatory during one of its routine planetary scans.

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The technician Ophelia Collins was sitting next to the machine, monitoring the results on the computer. She waited for the details which were needed for her upcoming paper on planetary motion. Suddenly, she stood up, startled, and walked over to the large telescope in the corner. Confused, Langley walked up to the Planetary Motion Machine (PMM). He knew that technicians rarely used the telescope, for they were not nearly as accurate as the PMM. He looked at the information on the crystal display and saw something that made his head spin: '**Body of five solar masses detected 1,670,200 km away from Earth.**'

This can only mean one thing.

At the same time, the technician walked away from the telescope, looking grim. She pressed the red button next to the door that gathered all the scientists to the room.

Collins turned to Langley with a panicked look and said, 'A black hole has been detected near the Earth. This is a cataclysmic crisis and will cause total destruction to Earth as well as the moon.'

Soon, people started to spill into the room. The next few minutes were a blur. All the scientists were talking over one other after Collins had read out the report. It was impossible to hear what was going on. Langley shivered. If even the scientists reacted in such a fearful manner, the response of the general public would be inconceivable. After the chaos stopped, a heated discussion ensued, with questions being spewed from every corner of the room.

'How did a black hole just suddenly appear out of nowhere? Are you sure this isn't some sort of inside job?' said one of the international chemists.

'This must be some type of mistake! Check again! There is no way that a black hole could have entered the solar system in such a manner!' exclaimed one of the ecologists.

'I have checked multiple times. The accretion disk is clearly visible. It has already started to consume flying debris near the Earth,' sighed Collins.

'How are you sure that the Earth will get consumed by this black hole?' questioned a geneticist.

'Is there a way to redirect the black hole or at least escape from it?'

'Is it possible to force it to collapse upon itself so that it just disappears?'

Langley decided that it was time to step in.

'To answer your questions, the Earth is clearly within range of the Schwarzschild black hole. Before long, the moon will get absorbed. Then, it will be

Earth's turn. In terms of redirecting black holes, it is close to impossible, and even if it was, our capabilities are not advanced enough for such a solution. Currently, due to our current distance from the black hole, it is still possible to evacuate. It is only when the Earth crosses the event horizon, which is around ten kilometres away from the singularity, that there is no turning back. Unless, of course, you travel faster than the speed of light. Another possibility would be to force the black hole upon itself. However, this would require the energy equivalent to four trillion times that of the sun, which we do not have access to.'

'Can't we just escape to other planets in the solar system that are already inhabited?'

'That is possible, but the black hole will continue to move through the solar system, consuming other planets. It would be difficult to leave the Earth without having to deal with these consequences later.'

'Then can't we leave the entire solar system and find another place to live?'

'It isn't that simple. We have not been able to develop technology advanced enough for humans to leave the solar system, much less take us to a habitable planet. The nearest habitable planet Proxima Centauri B is four-point-two light years away from the Earth. The fastest spacecraft that we have, the *Hawking*, can only travel at six hundred forty-two thousand metres per second. In comparison, light travels at around three hundred million metres per second.'

Langley grabbed the nearest mind reader and attached it to his head. An equation appeared on the screen—'**9.461*1015/642367/60/60/24/365/*4.2**', followed by '**CALCULATE**'. Then a set of small black numbers popped up next to it—'**1961.53699711**'.

'That is the number of years it will take to bring people to Proxima

Centauri B if they leave right now in the fastest possible aircraft. Two millennia,' he said, waving at the display. 'And that is without mentioning that we do not have the resources needed to survive there. In our current state, there is no way to get humanity to safety. We must accept our fate and enjoy what we have while we still have it.'

The memory faded away.

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The scientists did not listen. They still tried to create something that could travel faster than light. The moon had recently been consumed by the black hole, causing mass destruction. The loss of the moon's gravitational pull meant that over three hundred cubic kilometres of water was displaced, causing massive tsunamis all over Africa, Oceania, Europe and parts of Asia. The death toll only continued to increase.

The other physicists were adamant that they could figure something out. They had already failed multiple trials in crossing the barrier of light speed. Despite this, the other physicists were continuing their efforts to defy Einstein's Theory of Special Relativity. They said that his theory was devised in the mid-twentieth century; it must have been inaccurate to a certain degree. They refused to believe that the human race would die out. Their pride caused them to believe that humans were indestructible.

Langley walked over to the side of the lab where his office was and sat down in his acrylic chair. He then pulled out a black, leather-bound notebook. 'Black Holes' was embossed on the cover in a silver design. Most people thought it was strange that he still hand wrote everything, rather than using the mind-reading technology that had been developed. Langley had chosen to write by

hand, as he found that writing that was therapeutic for him.

Langley flicked through the pages until he reached the heading 'Crossing the Event Horizon.' The page was neat, with detailed diagrams on one half and words on the other. He started reading.

Black holes are so dense that they bend time and space. Once something gets past the event horizon, nothing can escape from them. As a body of matter enters the Schwarzschild Radius, it slowly disappears into the centre. From the outside, this would look like something fading from view. The mass being pulled in by the black hole's gravitational force would then get closer and closer to the singularity, to the point where there is an infinite amount of gravity. This gravity would completely rip apart the object in a process called spaghettification.

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So far, over fifty million people had been evacuated to Mars, Saturn's moon Enceladus and Jupiter's moon Europa. Spacecraft were flying in and out on an hourly basis in an attempt to gather as many people as possible. It was not released to the general public that the black hole would rip through the solar system, decimating any planet in its way. The governments decided that they should give the public a sense of security first. They would get everyone out of the black hole's immediate path before creating a plan to leave the solar system. This would give them up to eleven months before the entire solar system would be destroyed.

There were just four more hours until the predicted time of the Earth's annihilation. The black hole was now visible from the Earth as a dark circle, bending everything around it into a circular shape surrounding the darkness. Langley understood that this was the fate of humanity, something that they could not escape, no matter how hard they tried. He turned on the news broadcaster that was embedded into the wall next to his desk. The lights on the buttons turned

blue, signifying that the machine was now connected to the station.

'The mission to create a spacecraft exceeding the speed of light has not succeeded. The focus of the physicists will now be to produce more spacecraft to evacuate as many citizens as possible. So far, incredible progress has been made with the evacuation efforts. Millions of people have been successfully transported to other planets and moons. Large scale lift-offs will be occurring; anyone who is currently waiting at the spaceports will likely be evacuated soon. We estimate a total of seventy-nine million people to be relocated by the time we are hit. On behalf of the government, I would like to thank you for your patience.'

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The scientists had failed. Langley wondered how long it would take for them to learn from their fatal mistake: their own lack of willingness to face uncomfortable facts had hindered their ability to progress scientifically. Humans would have been more successful if they had just acknowledged their failures and shortcomings, and used them to improve and develop. They might even have been able to deflect the black hole that was now going to consume everything that humankind had known.

Instead of simply enjoying the time that they had left by going out with their families or simply taking a walk in the park in the autumn weather, they decided to attempt to evade the inevitable. They should have just accepted fate. No one was ever satisfied yet no one was willing to change.

Langley walked over to the large plexiglass windows next to his desk. The sun was hanging low in the sky. The rays reflected on the windows of the International Scientific Cooperation Institute buildings, glimmering as the soft winds rustled in the nearby trees. A bird flew past the window, feathers shining red in the light. It perched onto one of the high branches of a nearby oak tree,

twittering away, completely oblivious to its approaching fate. From this angle, the black hole was not visible. Everything seemed normal. The glow from the sun illuminated the Rocky Mountains of Colorado, bathing everything in gold. The sun dipped lower towards the horizon, shifting the sky's colour to a coppery orange, then to a bright crimson, before finally sinking below the horizon line. As the last remains of daylight faintly streaked the sky, a lone dog pattered across the well-cut lawn towards the woods. Professor Stewart Langley turned around and walked back into the laboratory for the last time.

SACRIFICE

Sally Song

November 2nd, 2069

My beloved Luna,

Perhaps you are upset that I haven't written in a long time. I have been occupied as of late. Matters in The City have left me with little to no time for writing. A disaster has befallen The City, lives were lost and I grow more weary with each passing day. I don't have much time now; I only write this letter to apologise for the murder that I have committed. I will explain the incident from the start. You might find it easier to forgive me then, when you understand.

The disaster started with the disease. The disease that took thousands of

lives in no time. We were too slow to react. There was nothing we could do to stop it from spreading. And then there was the people's reaction. The waves of anger and terror that ensued. But by then the disease had spread so far there was virtually nothing we could do to save them, Luna.

They couldn't breathe. When they spoke they wheezed. They could barely even cry for help. They coughed chronically, green mucus seeping from their throats. We determined that the disease was Chronic Obstructive Pulmonary Disease, COPD.

We discovered that almost everyone, if not everyone in The City had been infected. The disease was caused by the inhalation of polluted air that filled The City. The bronchi in the lungs lost their elasticity, trapping carbon dioxide whenever air was exhaled. The amount of air that can be breathed in and out gradually decreased. Breathing became more difficult, until at last, the patients were unable to breathe.

We considered the possibility that the people's exposure to The City's air pollution had long accumulated in the lungs, growing and developing into early-stage symptoms that escaped their notice. By the time they noticed these symptoms, it was too late. At the later stages of the disease, it would already be affecting them considerably.

The disease was non-infectious, but that did not make matters better. The whole City was already infected. Even if the population managed to survive, genetic inheritance would cause the next generation to be prone to infection. COPD, a progressive disease, only worsens over time. It is impossible to permanently reverse its progress. The disease was unstoppable.

The obvious solution to resolve terminal COPD was lung transplantation. But it was not possible; there were no healthy lungs that could be used. Even the

few salvageable lungs wouldn't be enough. Most would die.

I am sorry to give you such a lengthy description, but I was awfully frightened, Luna. Should the situation have prevailed, The City's population would have died out.

As we became aware of the situation, we took action. We forced the people in The City to use the underground tunnels. There, they would not be directly exposed to pollution.

All our medical supplies—oxygen therapy, bronchodilators, corticosteroids, antibiotics, theophylline, vaccinations—were provided to the people. They only eased the bronchi and reduced infection temporarily.

Soon enough, a new problem emerged. The City had a population of millions. There were not enough supplies. The pharmaceutical department sought to create more, but there still no time to create enough medication. The patients would have perished by then. COPD killed people faster than we could save them.

We distributed what little supplies we had left. At this point, The City had given up. We accepted that many would not survive.

First, we supplied ourselves, the scientists, with medicines that would keep us alive for one year; then, we supplied the people working in the parliament, the people in power. The last bit of supplies was distributed among the people, with the educated and contributing being a priority.

Yes, Luna, the people of the least importance were left to die.

Please don't be dispirited, my love. I'm sorry that it had to be this way.

As I mentioned before, the scientists were kept alive. Forced, to stay alive. Death wasn't an option for us. Especially me. I was forbidden to share my medication with anyone else. Not even our Emily. It broke my heart, darling, but I understood why.

The people who did not get any medicine were taken to the hospital and left there. Weak and aching, deprived of the ability to breathe. They suffocated. They coughed violently and spat up dark yellow mucus. They looked like they were possessed by demons: fragile and thin, they died with their faces contorted in agony. Fingernail beds an abnormal shade of blue, bodies swollen and limp against the hospital bed. You would have been so sad, Luna. Your tender heart would have ached for them.

They died with water and resentment in their eyes.

It was unfortunate, Luna. You wouldn't have agreed with their suffering, but it was the way it had to be. They sacrificed their lives for us to survive and save The City. The death rate increased every day. We could not find a way to stop people from dying.

Our Emily was sacrificed as well. She was only three.

I'm sorry.

I didn't get to see her.

Forgive me, Luna.

Love,
Michael

***

I put down the pen. The pauper across the room whimpers. I look up to the paper. He is gazing at me. His eyes are tormented and he is soundless. His silence is pained and melancholic as if within the simpleness of his intuition, he knows the fate that awaits him.

He sits in a single chair on the far side of the room, curled up with his

nose buried in his knees, the bones on his spine protruding. The worn hospital gown hangs loosely off his unnaturally thin body.

I glance at my wristwatch. 14:46. About time. I stand up, startling the pauper. I open the door and point at the hallway. He shuffles to his feet. I switch off the lights and walk out into the hallway. His soft footsteps follow me.

November 14th, 2069

My precious Luna,

Where are you, my dear?

I have been wondering why you haven't replied to any of my letters. I thought that perhaps you had forgotten about me.

You haven't, of course. I know you wouldn't. I was only being foolish. Forgive me, Luna.

I have been worried. The matters of The City have gotten worse. More people have died. I am still alive, shamelessly surviving off the medicine that cost others their lives.

About a week ago, things took a turn upon my trip outside The City. The existence of the paupers had faded from memory long ago. People were certain that they had all died. The visit suggested otherwise.

Far outside The City, lying on the ground were thousands of strange and skeletal beings; the paupers, thin and hollow from starvation. Fleshless and barely breathing. Thoughtless, emotionless creatures. Their houses wept, trembling on the verge of collapsing. Cannibalism was a common occurrence in the area. Everything reeked of savagery and inhumanity.

Their hunger saturated the air, coiled and tangling with the fumes of faeces and foul blood. I wondered how this huge population of paupers had managed to stay alive. An instinct to escape filled my body as the paupers groaned and crawled towards me. Their bloodshot eyes shone green with insanity. Do not go to visit them—they would devour you alive, darling.

They had nothing to eat. Indeed, they had nothing at all. Yet, they had healthy lungs. The distance from The City had kept the paupers safe from the air.

They were the only solution to the problem.

Remember when I had told you, that if there were healthy lungs available, lung transplants would solve the problem?

The process of transplanting lungs is complicated, for the number of paupers was about half the population of The City. We would have to split the two lungs of one pauper and transplant one into each person, removing the infected lungs. People could survive with one lung. However, the process of finding recipients and donors with matching lung sizes and blood types was difficult and troublesome. It involved performing body checkups on the entire population. The process would be lengthy. But I was and still am determined, my dear, and nothing can stop me.

The paupers were nourished and nursed for a month before they were taken into the lab. My dear, you should have seen them eat. It was horrifying. Though the results showed considerable improvement in the pauper's health conditions, they were still ill and underweight.

We began putting people on the waitlist for lung transplants. The first person we performed it on was a middle-aged woman, a teacher, with end-stage COPD like everyone else. The transplant was successful.

As we continued with our transplants, the pharmaceutical department created immunosuppressant drugs, used to suppress the immune system and weaken its reaction to foreign tissue. This was necessary as when tissue from another body had been transplanted into the recipient's body, their immune system would detect the foreign tissue as a threat and attack it. If not treated in time, the tissue would be severely damaged or even completely destroyed. Rejection was especially common after the lungs transplantation. This meant a lifetime of immunosuppressant drugs.

The drugs also had side effects that caused damage to the recipient's health. Some of the potentially dangerous side effects were susceptibility to diseases, kidney damage, and even cancer. From research, we knew that consuming a variety of immunosuppressant agents would reduce these side effects and enhance the function of the drugs. We needed a greater supply.

The plan was as followed. People who had received a lung transplant would consume current supplies of immunosuppressant drugs. They would give their COPD medicines that they no longer needed to the people further down the waitlist for lung transplantation. Thus, the lung recipient would have enough immunosuppressant drugs to keep them alive until more could be created. The people that hadn't had a lung transplant would be able to stay alive with the medicine until a transplant became available for them.

Everything went according to plan. There will be no more deaths, my dear Luna. Aren't you delighted to hear this?

Well, except for the paupers.

As you may have expected, darling, trading the paupers for The City created controversy. People didn't agree with me. Especially the parliament members. They had voice and authority; they turned the people against me. *This is inhumane.* They had declared. *Killing people is wrong.* You would think so too, dear. But I have described the state of those people to you. They were starving. They were suffering. Nobody was willing to help them. My only crime was ending their suffering.

The parliament members called me a monster. They claimed that it was immoral to fool the paupers into sacrificing for the people in The City. *They are humans as well.* They said. *Their worth should not be defined by the level of education they received or their contributions to society.*

How are you alive, then? I asked them. *If not living off what the so-called 'lesser' people were robbed of?*

Hypocrites. Selfish pigs. Having led privileged lives, who were they to criticize my actions? I had told them, more than once, that this was the only way. But they would rather fill the future with their feigned righteousness rather than our survival.

Did they think I wished to kill the paupers? Did they think it did not pain me to see the look of fear and accusation on their faces as their eyes flickered to the surgical knives in our hands? You should have seen them, Luna. I still grieve for them now, but I understood at the time that their sacrifices were for a greater good. The paupers would die, but their deaths would save The City.

They don't understand that. They want the world to be a utopia, but utopias don't exist. People die. People suffer. Sorrow is inevitable. Where there is joy, there is sorrow. Where there are people living contented lives, there are people living in pain. The parliament members could not accept this truth. They blamed me.

I am not the monster they said I was. I merely accepted that everything has a price. As I accepted that you were the price that must be paid. For our dearest Emily.

I'm sorry, my dear.

Love,
Michael

⁂

I look out of the window. Are those stars I see? Glowing, smiling against the night

sky?

I close my eyes. I open them again. The stars have disappeared. The polluted darkness outside of my window stares at me. I switch off the lights and walk out of my office.

November 17th, 2069

My dearest Luna,

I am searching for an image of a sunset in my head. It appears around this time, as I recall. We used to watch the sunset together, Luna, do you remember? It was a long time ago, when you weren't pregnant with Emily and the sky was clear. We were both young and untroubled then.

We sat on the grass, your hands in mine. I remember the way the insects buzzed softly around us. I remember the way the sweet scent of gardenias filled the air.

I remember the way the glowing sun dove under the horizon, bit by bit. Solemn and unhurried. Its beauty took your breath away.

Your beauty took my breath away, darling.

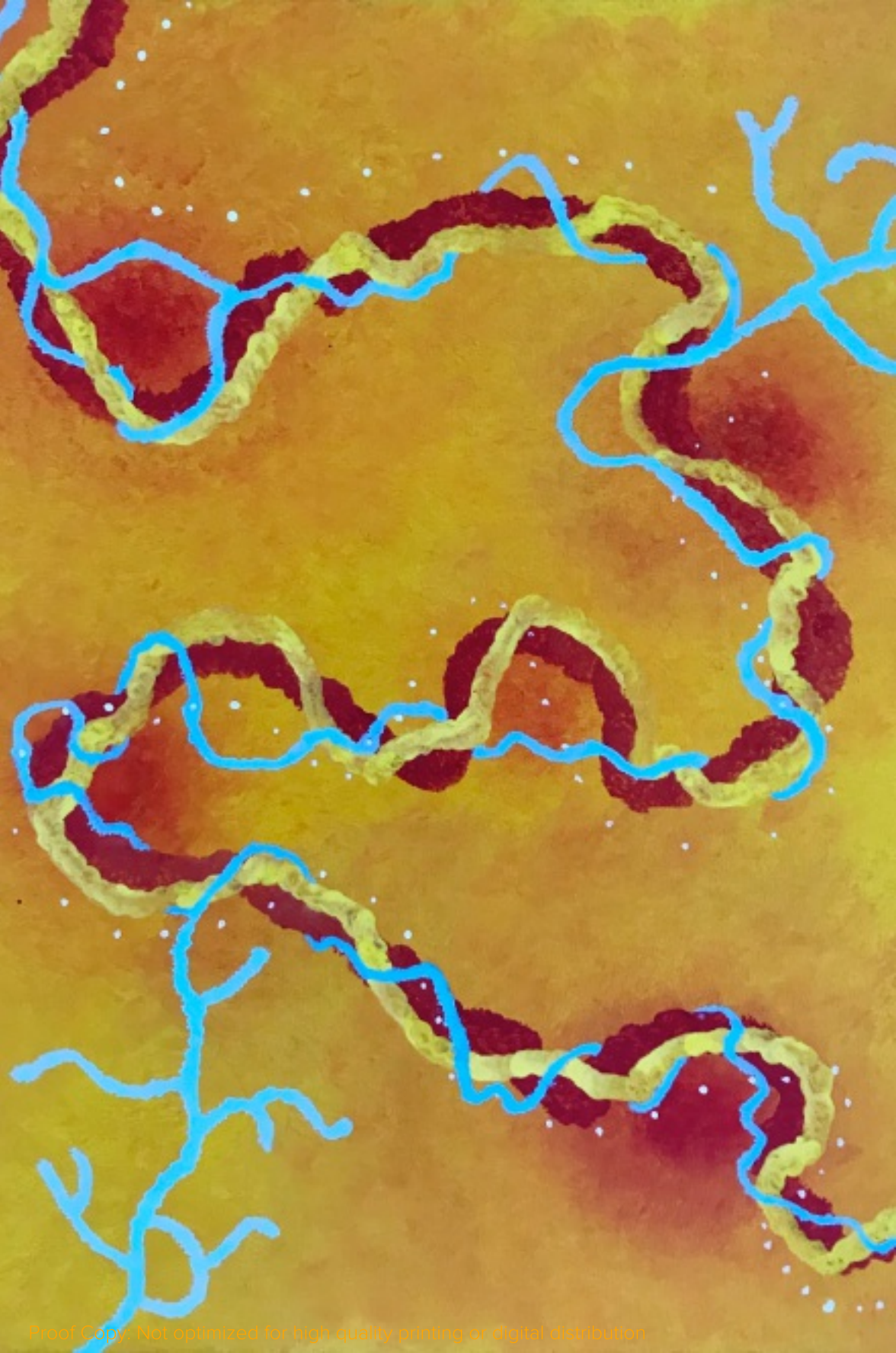
Life seemed to have killed everything beautiful.

Love,
Michael

***

The room is utterly still. As if waiting for me to make a motion.

I turn in my chair and smash my head into the wall. Again and again. The sound of my skull against concrete rings through the room.



LETHAL DECISIONS

Crystal Deng

Ron knew another city had just gone dark.

He always thought it was ironic to name such a calamitous blight after Prometheus. He worshipped the Greek God who aided humans during the darkest times, yet he despised the disease that shared the same name. Prometheus had not found him yet, and for this he was grateful. Most people were infected, and many others were dead. The healthcare systems consumed an astonishing amount of power, but their efforts were futile.

Ron snapped his attention towards the dying electricity generator. He viewed his work as prestigious and crucial during such hard times, but without the vigilance of his colleagues, he was unable to sustain the station by himself. The

guilt of his failure and the loss of his friends gnawed at him.

Conscious of the time, Ron glanced at the small rectangular window overhead. Greyish white moonlight filtered through it. It had a sickly aura. Ron collected his belongings and hurried out of the station's front doors towards the welcoming warmth of his apartment. Ravens cooed in the darkened sky, empathy lingering in their cries. That unsettled Ron. Was it his imagination, or did the ravens have some degree of sentience? The Scientists released some mutated species into the wild as an experiment in the past, so now it was difficult to distinguish between the creations of nature and the works of humans. They were understood as one in this disturbed ecosystem.

Ron loathed the results of the experiment. He loathed the Scientists who were ignorant enough to meddle with nature. He loathed the lifelessness around him, which used to be so filled with vigour.

The atmosphere of the barren world surrounded him. The sense of decay made him agitated. Ron levelled his right eye with the retina scan next to his door. A beep sounded, the scan flashed green, and the double metal doors swung inward. He stepped into the house and slammed the doors shut.

As Ron bent down to pick up his shoes, an expected pain shot across his back. Wincing, he stood back up and strode into his bedroom. The soreness in his back was not going away, no matter how much salve he applied or how he stretched every night. The pain was particularly sharp today. The escalating nuisance bothered him. Still, he soon sank into a fitful sleep after the day of work. Ron had never entered the blissful world of dreams, which the Scientists declared was a weakness that needed eradication. Some fools, Ron's ancestors included, believed the claims and underwent surgery to remove their dreams. This removal, later discovered, was heritable. Ron and his descendants would only know dreams

as a fairytale.

Too soon, the alarm sounded and Ron woke to glaring sunlight. He bolted up. A wave of intense back pain and a rush of nausea attacked him. His head swam. He leaned over the bed and retched. Then he stumbled to get dressed for work, though he knew it would be a wiser choice to stay in bed and rest.

His face washed, Ron felt a moment of clarity. *Why am I sick in the first place?* Ron wondered. Reason followed. *When was the last time I was* this *sick?*

He searched his memory, coming up blank. Altering his immune system so that virus infections could be fought off before they manifested was one of the little good deeds the Scientists performed. Then what, if not a viral infection? A bacterial infection seemed unlikely. He had taken so many vaccines that orthodox bacteria was ineffectual. Unless it was some much stronger, more adaptive variation…

The realization hit him. It was so dizzying that he had to hold onto the bathroom wall for support.

Ron refused to believe it. With a sense of guilt, he decided to skip work to verify his thought. Rushing to the hospital, he said to the reception Scientist immediately: 'Ron Hayes, card number EV-00849, in need of a diagnosis.'

The Scientists had taken over the hospitals when Prometheus began spreading, and the original staff had become their subordinates. The Scientists were arrogant, believing they could save humanity. Their hold over the gene editing CRISPR-Cas9 system was absolute, as was their faith in it. When the Scientists found the 'perfect' solution to rid Prometheus, they immediately began to put it into use. The solution was tested on the first wave of people wrecked by Prometheus. While the Scientists claimed the results to be successful, others said they never saw the first CRISPR-Cas9 patients again. They said incorrect changes

were made. Instead of the immune system growing stronger and fighting off Prometheus, it gradually ate itself up.

The Scientists' only response to the accusations was that '*every revolution requires sacrifice*'.

Time passed. Doubt lessened when the Scientists announced that they found the perfect cure, though it would cause slight asociality. *Everything has its price,* they had said, *And the prices of the CRISPR-Cas9 treatment will be high.*

As if oblivious to his urgent tone, the Scientist waited before looking up. Ron immediately recognised her as a former friend, Ashley. Ashley's eyes were carefully blank, as if her body was detached from her mind. She repeated, 'Mr Hayes.' The voice was calm, so different from Ron's frantic tone.

The CRISPR-Cas9 treatment was free for the Scientists. It must have sounded irresistible to Ashley when she had first contracted Prometheus. Living mattered most to most people, and she had been willing to pay the price for her life. Still, Ron felt a surge of animosity towards her inhumane behaviour.

'Yes, I am. Can I please get a diagnosis? I'm feeling dizzy and there is a pain in my back.'

The Scientist's face remained impassive. Raising an eyebrow, she said in a dispassionate monotone, 'You are normally a collected man, Mr Hayes. Listen to yourself now. I suspect you already have an idea of the disease you caught. Why are you wasting your time and money on this diagnosis?'

'I need to know for sure.'

'Suit yourself.' She rose and led Ron to a pair of glass doors. Moving with feline grace, she turned on a machine and gestured to it. 'Lie down and do not move. I'll come in later.'

Ron nodded stiffly, as ruffled by her as he had been when he first met this

different version of Ashley. The lights dimmed as he laid on the machine, and he let himself drown in a whirlwind of thoughts. He had seen some of the CRISPRed. He had avoided interaction with one for a long time. Now, meeting Ashley once more, Ron was again aghast of how lightly the Scientists brushed over the side effects. She was so coldly uncaring, incapable of feeling. Ron shivered as he reminisced about what Ashley was like before the mutation. Shrewd but congenial, she excelled at social interactions. She was the first decent Scientist he had known, and they had grown friendly. Until Ashley caught Prometheus and got CRISPRed; she was never the same again. Ron still had execrable memories of when he first learned the news.

The lights brightened. He sat up carefully, an ominous sense of déjà vu of the morning washing over him. With the elegance of an athlete, Ashley strode into the room and stopped before him.

She looked straight into his eyes. 'Prometheus.'

Ron struggled to remain upright. The world spun once more. He whispered, 'Impossible.'

'Entirely possible. In fact, most people are infected by Prometheus. You are among the minority, Mr Hayes. Accept the fact. Denial will just make everything worse.' Not even a shimmer of sympathy was reflected in her words. If anything, Ashley found his weakness bilious.

Composure long gone, Ron managed to drag out, 'How can anything be worse?'

'For one thing, Prometheus is known to cause a prolonged and agonizing death if you ignore it. I suggest you, Mr Hayes, to receive proper treatment immediately.'

Friable hope rose. Ron knew it was imprudent to let such brittle

misleading feelings surface, though in these dire circumstances, he was willing to do so.

'Oh? Is there a cure to Prometheus that I am not aware of?'

Faint amusement played on her lips as her gaze swept the room. It was the first emotion Ron noticed since they met. 'Naïveté, Mr Hayes, naïveté. I thought better of you. Such risible comments,' she shrugged imperceptibly. 'No, Mr Hayes, the Scientists have not discovered a cure. If we had, surely we would have shared this brilliant discovery with the world.'

'Then how am I supposed to receive treatment?' Ashley's cold demeanour was a sharp jab to Ron. His resentment towards her rose above his own devastation.

Her emotionless eyes returned to his face again. 'Why, Mr Hayes, you should know this. The CRISPR-Cas9 system is available to all who are willing to pay.'

'Ashley, I know you are aware that I am not an advocate of this system.'

'I can understand why you were wary of CRISPR-Cas9 before, but now? I am lost. Why are you still reluctant when your life is at stake? The nation needs engineers like you. If you are unable to afford the price, we can negotiate so that you can pay the debts after the treatment. This is a great honour, Mr Hayes. Special cases are not given lightly.'

Ron considered the price. It was a colossal sum, but it was affordable given Ashley's proposal. Ron could dig in his savings over the years. Besides, nobody relied on him. Ron shook off the temptation, chastising himself. Keeping his options open, he said, 'First, tell me exactly how CRISPR-Cas9 works.'

Ashley nodded, her brows raising. Did he detect grudging approval behind that ice?

She replied, 'As you probably know, we adapted CRISPR-Cas9 from the bacterial immune system around a century ago, into our own CRISPR-Cas9 lab experiments today. CRISPR is an abbreviation for Clustered Regularly Interspaced Short Palindromic Repeats. Essentially, bacteria capture pieces of an invader's DNA, and uses these snippets to create segments called CRISPR arrays.'

'This sounds similar to a cut and copy device.'

'That's an intriguing way to look at the concept. But yes. The bacteria cut the invader's DNA, creates CRISPR arrays, and copies the segments into RNA samples.'

Ron caught up with the idea. 'And when the invader tries attacking the bacteria again, the bacteria can use the RNA to recognize the invader's DNA. This is like a minesweeper for dangerous substances once you have identified them.'

Ashley frowned. 'Your comparisons are non-scientific but easy to understand.' She looked at Ron with an odd look in her eyes. He could almost see the wheels in her head spinning. She continued, 'This is where Cas9 comes in. This enzyme cuts into the DNA of the invader, and therefore disabling it. The concept of CRISPR-Cas9 is derived from this. We create the RNA and the guide of the DNA sequence we have targeted. Once recognized, Cas9 can cut into the sequence. We will then be able to alter, add or remove the genetic material.'

She assessed his slow nod of acknowledgement. He wore a slight scowl, his eyes still hesitant. As if sensing his unspoken question, Ashley said, 'The initial years of using CRISPR-Cas9 were rough. Experiments went wrong, and some died honourably. But, their death was impending, and CRISPR-Cas9 offered a greater chance at survival. They had cancer.'

Cancer? If he recalled correctly, it was quite harmless. Seeing the

blankness in his face, Ashley explained, 'At that time, cancer was one of the most lethal diseases. Now, thanks to CRISPR-Cas9, cancer is nothing to worry about.

'CRISPR-Cas9 has done much for humanity. Humans changed for the better. We learned about animal behaviour and the heritability of mutated cells. We wiped out most genetic and insect-transmitted diseases. We resurrected the dodo birds. We acquired immunity from virus infections. We gave people perfect eyesight and hearing. Your doubts are unfounded.'

Ron suppressed a rising peal of hysterical laughter. *CRISPR-Cas9 has done much for humanity.* Ashley had said. What she chose not to mention was *'with equally tremendous consequences.'* How many experiments had went wrong? How many lives had been lost? How many had suffered a fate worse than death? The trees were short and thick, the animals uncanny, the insects wandering listlessly. Wealth gaps were graver than ever. The society was separated into the 'better' humans and the 'lesser' humans. There was constant arguing over superiority. This was without mentioning that CRISPR-Cas9 had tampered with nature itself. In many ways, CRISPR-Cas9 shattered the world.

Even so, Ron stayed silent. Ashley stood with her arms crossed, her feet tapping the floor. Her half-lidded eyes did not do enough to conceal the numbness behind her polite facade. Ron knew it would be useless to argue with a machine.

'Perhaps. Though I still do not share your sentiment. There is a chance that I will reconsider after you tell me how CRISPR-Cas9 will kill Prometheus.'

Ashley straightened, satisfied with his ambiguous answer. 'We can modify the T-helper cells in your immune system. We will extract the T-helper cells from the body, use CRISPR to engineer the genomes within the cell and transform them into super-fighters. After they are re-infused into the body, they would be able to defeat Prometheus. The modified T-helper cells are originally heritable.

However, for the benefit of the Scientists' Society, we have removed the heritability of the engineered cells. After all, what is the point of us giving something as precious as the CRISPR-Cas9 treatment to the world for free?'

'*The point?* Millions will no longer suffer from Prometheus! What is your company's *profit* compared to millions of lives?'

'Our profit is a priority of oura. Most of the Scientists have agreed to this, though the non-mutated Scientists have tried the hinder our efforts. Furthermore, the CRISPR-Cas9 treatment offers many additional benefits. Not only does it enhance your immune systems, it also enhances your physical abilities. For example, the intensity of muscular fibre recruitment will increase, leading to unsurpassed muscular strength. The side effects of this treatment are minuscule—'

Ron interrupted, 'The side effects are monstrous.'

He wanted Ashley to lash out with anger rather than nothing at all. She did not. 'As I have tried telling you before, the desirability of the accompanying traits significantly outweigh these drawbacks. I am stronger, faster, more agile than before. The flaws of my body are dimmed after the mutation. Mr Hayes, surely you would want that?'

Under normal circumstances, Ron would have denied any allure towards the CRISPR-Cas9 system without hesitation. Alas, nothing was ordinary currently. Impulse coursed through his body, his imagination flying wild. *She must feel so powerful, so in control of her body*, Ron thought. Yet, Ashley's smirk nagged at him. She thought she had won him over. Ron fought the promise of life and strength. He knew it was a facade of an empty shell. His head cleared.

'The flaws of your physical body may be dimmed. These flaws turned into fatal ones in your mind,' he spoke passionately, 'Ashley, do you feel anything? Is there any of your former solicitous self behind that brick wall you put up? No. I

cannot agree to this. The cost is too great.'

Decision made, Ron stood up abruptly and paid for the body scan. She stared at the money, an eyebrow raised and an arm outstretched. *Surprise still betrays her*, Ron thought absently as he stalked away. *I guess nobody escapes that.*

As he made for the doors, Ashley recovered from her astonishment. 'You have made your decisions rashly, Mr Hayes. The other CRISPRed and I might go against what you believe, but we are a better race. We are free of the bounds of our former bodies, and we will eventually dominate the world,' Pausing, she let her message sink in. 'And you, Mr Hayes, will continue to be *normal.* You will never have a chance to experience the sensational feelings of such a body. You will rot away as we thrive.'

Covering his flinch at her casual mention of world domination, Ron turned and saw her leaning against the walls. Her vacant features chilled him once again. Ron gave her a rueful smile and said softly, 'What is so bad about being normal, Ashley?'

A minute later, Ron collapsed onto his bed. His head spun from the unpleasant confrontation. *And the disease eating away my life*, he added bitterly to himself. Tears swam at the back of his eyes. He took huge breaths and forced them back.

Ron chewed over what had happened and was stunned to realize that he harboured no regrets. He had chosen the lesser of two evils, between death and losing himself. Perhaps it was the coldness of the current world, perhaps it was Ashley's indifferent behaviour, that Ron was strangely thankful for Prometheus taking his life before he had to witness more savagery.

Ron's thoughts wandered to forbidden places. Billions of lives diminishing, unable to afford the prices of CRISPR-Cas9. Millions of righteous souls resisting

the lure of CRISPR-Cas9, the last bit of their lifeforce expended, their valedictions offered to the reprieve of keeping their humanity. Would Ashley's warning come true? Would power struggles and manipulation become a new normal? Would CRISPR-Cas9 wipe humans of any warmth? The world would be chaotic, atrocious, an abomination.

Most feelings would cease to exist. Then, would the residents of Earth still be human?

But Ron still had a sliver of hope.

The humans who escape Prometheus will become robust. Their strong genes will pass on to their descendants. They will even eventually acquire immunity from Prometheus. They would survive and their numbers will eventually flourish after years, decades or centuries of distress. With the unity of hearts and wills, they could defeat the unfeeling CRISPRed and restore the planet. Perhaps irrevocable changes would occur as time flies, perhaps this vision was pure fantasy, but Ron could still dream.

And so, Ron lay in his bed and stared at the barren yellow lands beyond him. His own destruction was inevitable, but the destruction of humanity was not. Dire as his repercussions were, there was still hope.

RESET

Tatiana Zhang

The moment Yiyong's head hit the pillow, the elderly man fastened his own tenebrous cloak. He turned the knob attached to the clock. The dotard put his scythe down and smiled at the peaceful Yiyong. He snapped his fingers and closed the gap between the skies and the Earth...

***

'Males?'

'No, females. Male subjects might get violent.'

Alastor fidgeted with the whiteboard marker. His chocolate hair was slicked to one side and his sharp jawline was a gift from heaven. While Alastor was a rather handsome man, he had a frigid attitude to everyone except his family. He

was in a meeting with a group of scientists in suits, who were all part of the International Board of Engineering.

The white square lights that turned on upon entrance added to the tension in the conference room. The matte grey laptops created a stark contrast with the bronze watches on the clasped hands of the scientists, feigning interest towards any given project. These men were more obsessed with money than with science. Alastor did not think that he was any different, but this project meant a lot to him. He had always wanted his family to stay with him forever.

The Eternity Project did not abide by the law. The participants were not told the possible side effects, for the knowledge may hinder their decision. The discussion of who would be the appropriate first subject was interrupted by the gruff voice of the Board Chair, Lucius.

'I hope you're all aware that this project is illegal.'

'Y-yes, sir.'

'So why are you wasting time talking about the kid? How hard is it to find a subject? I want him by tomorrow. Alastor, I'm warning you.'

⁂

'Hi Yiyong!'

'Do I know you?'

The same response disappointed Aipian once again. A year ago, when she had heard the news that her brother, Yiyong, had gotten into a car crash and was in a coma, food was her escape. She had no need to think or feel when her mouth was full. The fleeting distraction had kept her sane.

Aipian now had a thick Chinese accent. Her hair, the colour of rotten salmon, was tied into a ponytail. She reeked of expired McDonald's Happy Meals

and her breath was not any better.

'Come on in! Take a seat there. I'll be right back.'

Yiyong hesitantly sat on the broken foldable lounge chair. In the room, the floral blinds were shut tight. The chandelier, half intact, let out a warm amber glow. A broken computer's keyboard along with a notebook with a torn cover was strewn across a three-legged table. Its mouse dangled hazardously off the desk.

'Alright!' Aipian appeared from the storage room, her bare feet treading on the wooden ground. Her reading glasses, lodged on her head, threatened to fall every time she took a step. She held a clipboard in her left hand and a silver flask on the right.

'What do you remember from yesterday? Therapy? Eating? Anything? Come on...' Aipian sat herself down on the wooden chair which groaned and creaked under her weight. She got up and moved to a maroon beanbag.

'The last thing I remember was the car crash. My second one, as a matter of fact. Daisy, my niece and I—' Yiyong began to explain the accident. He remembered the scene vividly. His memory, a broken recorder, played the clip of the navy blue truck crashing down towards them again and again.

***

'Yeah, he's an amnesiac. Real bad… Couldn't remember a thing I said yesterday. I feel bad for him, really, I do.'

Aipian was slumped against a grimy alley, its wall stained with graffiti and a few select profanities. A friend who owned a local Thai restaurant by the corner often gave Aipian leftovers. She would drop by every day at four pm for the food and 'a little alcohol.' The number of drinks spilt on the floor told another story.

'Excuse me, ma'am. I couldn't help overhearing that you mentioned

something about an amnesiac?' Aipian's conversation caught the attention of a man with hazel eyes walking by.

'Yeah. Yiyong's got amnesia. It's serious stuff,' she slurred, putting her phone down.

'How bad?'

'Livin' the same day over and over again. Like HM, you know. The bloke who lost his memory after getting the seahorse part of his brain removed.'

'Interesting. O-oh, sorry, I've got a lot on my mind. Excuse me for my terrible manners. I'm Alastor. Assistant director of the Board of Technology and Engineering. Do you mind telling me more about—Yiyong, was it?'

'Yeah, that's his name—Yiyong Shi. My mom and dad named him that 'cause it means bravery. He's a brave man, only thirty-four, but has already been through two car accidents. Real traumatic, I could imagine. Caused his amnesia.'

'Our medical company has just made a breakthrough in the science of memory, and we are now working with a new form of therapy that focuses on memory recollection after trauma. A man like Yiyong would potentially find it very beneficial. It would restore him to the man he once was. Yiyong would be your—did you say brother? *Your brother again.*'

Alastor quickly explained the Eternity Project to Aipian.

He gave her his number and urged her to phone him and consider the offer, promising that not only were they going to cover Yiyong's fees, but that they would also pay her about a year's worth of income at her discretion. The number he casually stated made her head spin. Despite the lingering haze of alcohol clouding her thoughts, Aipian could sense a hint of menace in his tone.

'I'll think about it.'

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Aipian lay flat on her back, staring at her ceiling, photographs stacked next to her. The orange glow of street lamps and the silver luminescence of the moon outside her window seeped through the small gaps between her curtains.

Occasionally, Aipian could hear a couple passing her apartment as men escorted their dates home. The girls' light-hearted laughs and the crinkling of the plastic wrapper around a fresh bouquet of flowers stirred up rancorous jealousy within Aipian.

Alastor sounded like a man of prudence and poise. Logically, I would take his offer. The money would easily cover both of us while I get Yiyong back on track. But something like this… it sounds too good to be true. That wouldn't make any sense; I've seen news coverage of this centre, they've made some of the greatest breakthroughs of this century. Oh, Aipian, you're just being paranoid. Plus, he would be part of a monumental scientific discovery. How many lives would this type of discovery save? Yiyong is my brother and I love him. I've been worrying about him for five years and I would gladly keep doing so, but I'm so tired. I need some time for myself.

Aipian tossed the old photographs back in the dusty box lying in the forgotten corner of the storage room.

One photograph escaped the box. A faded polaroid had fluttered away and rested lifeless on the concrete floor. Aipian picked it up and traced the plump cheeks of her laughing brother in the photo, as he played with the ornaments on the Christmas tree. She fiddled with the photograph and an involuntary smile crept across her lips. Clutching the photo like a lifeline, Aipian ran her fingers across the worn picture, allowing the dust to stain her fingertips. A minute later, the photo joined the rest of the discarded memories in the dark corner of the storeroom.

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Months after her encounter with Alastor, Aipian approached the colossal building looming above her. The behemoth's silver torso gleamed under the sunlight. A burly guard stood before the glass door, radio in one hand and his phone in the other.

Several office men rushed past her, scanning a card onto the small screen near the guard. They greeted the guard with a dutiful, curt smile, which he returned.

Aipian hurried to the security guard. 'Hi, this is Aipian Shi. I forgot to bring my card today, do you mind signing me in?'

'Yes, of course. Aipian Shi? '

'Correct,' Aipian replied, tapping her foot on the ground impatiently and fiddling with the corner of her shirt.

'Okay… Unfortunately, I can't find anyone named Aipian Shi in our list for today. Are you sure you haven't mixed up the dates? The Samsung meeting has been postponed to next Monday.'

'I'm sure. Check again. My name is on there.'

'I've already checked the list several times and I don't see your name. You're not allowed in here. I'm sorry.'

'I am!' Aipian, boldened by a sudden rush of fear, pushed past him and bolted to the door. The security guard, who was in much better physical shape than her, pushed her back with little effort.

'Ma'am, I understand your urgency but it's company protocol that only authorized personnel may enter controlled areas. There's nothing I can do about it. If you refuse to cooperate, I'm afraid I'll have to ask you to leave the premises.'

'I'm sorry, but I can't! Do you hear me? My brother's life is at the hands of people that can't be trusted! Let me in!'

'Ma'am, I'm going to have to ask you to leave the building.'

'Absolutely not! Please—you've got family too! You've got people you love. What if they might be gone in an hour? Put yourself in my shoes—please! Just give me one chance to save my brother.' Aipian could hear the desperation in her own voice.

'Ma'am, I'll have to escort you out. If you still refuse to cooperate I'll be forced to call for backup.' The guard's eyes were cold.

Aipian once again dashed towards the door, but the guard had an iron grip on her elbow. She screamed until she collapsed into the arms of the hefty guard, all life drained from her. And she continued to scream in her nightmares, her conscience tormenting her with images of Yiyong lying unconscious and helpless under blazing white lights and menacing steel claws. Blurred figures in white lab coats hovered at the edge of Aipian's vision. One of them had a pair of hazel brown eyes.

⁂

Aipian was exhausted. She was sick of her suffering. Normally, she would fall into an uneasy sleep in the early hours of the morning but a creeping uneasiness had sapped her strength. She collapsed on her couch. *Why can't I do anything right?*

After minutes of staring blankly at the wall, Aipian dragged herself up and staggered to the corner where the box of photographs had been abandoned a few days ago.

Japan, 1982. Aipian was twelve and Yiyong six. She grinned directly at the camera. Her brother's eyes were more vacant, focused upon the plates of sushi.

Hong Kong Disneyland, 1995. Aipian had graduated and her brother

Yiyong was still a freshman in college. They were standing before a towering roller coaster. Her arm was wrapped around Yiyong's. They were red and flustered and Yiyong's hair was askew, but both of their smiles had never been wider.

Milan, 2002. Both grown up, Aipian and her brother had taken a sibling-only trip. They were standing in front of the cathedral. There was still a childish twinkle in Yiyong's eyes while Aipian's eyes were those of an adult. It was the last time they had the chance to savour each other's company.

Her phone vibrated and a familiar caller ID flashed across the screen. A few moments later, a wrangled mess of sparking electronics lay beside the wall amidst shards of glass.

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'The operation seems to be successful. Thank you for the work you have put in. No side effects have appeared for now,' Lucius said, congratulating his team.

Two interns, studying at a local university, eyed each other nervously. One sat on the edge of his seat, twirling his ballpoint pen, while the other fidgeted with her nails. The boy blinked his eyes twice, signalling the girl to say something while the girl ignored him. Their act lasted for twenty seconds before the girl, fixing her black glasses restlessly, raised her hand and put on an assertive smile.

'Excuse me, sir, pardon me. May I ask, on behalf of both of us, what makes a human old and what have we developed to stop this natural ageing process?'

Lucius, taken by the young woman's beauty, responded with more patience than he normally would. 'When a human becomes old, cell senescence occurs, which means that the cells in our body become old and lose the ability to divide as the DNA becomes too short. As you know, telomeres shorten every

replication. These cells are thus turned off by the body, but after they are turned off, they either remain senescent or die off. Those who remain senescent, however, release odd proteins that cause age-related diseases. We have developed a ribonucleic protein called telomerase that is able to lengthen the telomeres, extending one's youth.'

'Thank you, sir. The idea of lengthening telomeres is indeed clever.'

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Yiyong did not panic when the surrounding void of darkness lifted. He surveyed the hygiene stations, bed alarms, and various monitors, and concluded that he was in the hospital room after the car crash. The smell of freshly bleached furniture intrigued him. White walls, undefaced by a single scratch, glared down at him. Despite the perfect condition of the furniture, the room was devoid of beauty and life; the same way Yiyong's existence was empty of meaning. The curtains, a barrier between the real world and Yiyong's, hung limp. Their dreary appearance compelled the nurses to fall into a state of tedium as well.

'Good morning Yiyong, how are you feeling?' A nurse in her mid-thirties appeared from the doorway. She plastered a smile on her face and pressed a button that brought Yiyong's bed up.

'Where am I?'

'As you should be able to recall, you were in a car crash. A huge one. You fell into a coma for around a year which allowed your wounds to heal. You'll be fine now. Just remember to check in with us monthly so we can monitor your health.'

'Sure. That's fine.'

The nurse reached in to grab the remote.

'Click this one with the bell to notify me when you're ready for your checkup. Breakfast will be served later. Take as much time as you need. Your toiletries are on the wooden table next to the small pantry.'

The nurse promptly left and Yiyong slumped onto the pillows. As he stared into nothingness, the steady rhythm of his pulse reminded him of the life that was still in him. He watched as another nurse wheeled the carts in and wrote down different numerical values on a sheet. His survival was a blessing. Yiyong grinned as he thought of Aipian.

A small smile reached Lucius' lips as he watched Yiyong's finger hover over the button once more through the one-way glass.

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Yiyong's eyes flickered open and he sat up with a jolt. He rubbed his sweaty palms and shivered in the frigid room. His nightmares had come to haunt him again. Try as he might, he could not fall back asleep, for the lifelikeness of his dream had put him on edge.

Yiyong heard a few muffled voices as he leaned his head back on the pillow. One he assumed belonged to Alastor while the other was Lucius'. With drowsiness still clouding his mind, Yiyong could only make out an occasional word or phrase from their conversation

'... amnesia… congratulations Alastor… experiment… gone well…'

'Thank you… cell senescence has yet to occur in Yiyong… immortality is extremely probable…. He doesn't remember anything… life easier…'

Yiyong tried to make sense of these words, but the throbbing in his head obscured his thinking. Assuming these 'hallucinations' were a result of the anaesthesia, Yiyong did not think too much of it. He lied back down and soon

succumbed to his somnolence. Yiyong's soft snores filled the barren room. The rustles of the wind, accompanied by the gentle tapping of the tree, sung a euphonious lullaby.

Gradually, as Yiyong entered a state of deep sleep, his snores ebbed away and an ominous yet peaceful silence returned.

⁂

The old man peered through the velvet clouds again, his eyes twinkling. He watched as Yiyong drifted into his slumber, his visage youthful and naive. The old man twisted the knob of the clock backwards. And so the sun rose from her chamber and the moon hid away beneath the blanket of clouds. 'Reset,' the old man whispered.

⁂

'Good morning Yiyong, how are you feeling?'

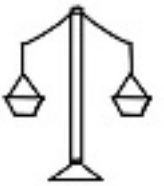
'Where am I?'

'As you should be able to recall, you were in a car crash. A huge one. You fell into a coma for around a year which allowed your wounds to heal. You'll be fine now. Just remember to check in with us monthly so we can monitor your health.'

'Sure. That's fine.'

EQUALITY

Manson Li



The leaves dance in the air. I glance outside the window and see them scattered around the trees that surround my home. They surf the seasonal breeze and flutter down, merging into a sea of red, yellow and orange. My house has protected me from the elements for five decades but offers scant protection from the cycle of life and death. Just as all leaves fall, I too must rest for eternity one day.

The clock strikes eleven, an hour from my death date. It brings a smile to my face. I feel nothing but acceptance and peace. The end of my five hundred years of living has finally arrived. Most do not realise my age, as my appearance suggests otherwise. My skin is clean of wrinkles and marks of the endurance of

time. I look like a woman in the prime of her youth. My grandson has gone to unbelievable extents to achieve this.

I reach for the leather-bound album which holds my most precious memories. As I listlessly flip through the yellowing pages, a small photo drops from the album. I pick it up and read the date scribbled on the back.

'December 12, 2095,' I murmur.

The date seems awfully familiar. My enquiry was answered as I flip the photo over. Just like that, I was drawn into my memories and away from reality.

⁂

I knew where I was before I opened my eyes. The volume of the crowd told me. I found myself sitting beside the President of the United States and my grandson. The buzz of the sea of people gathered in front of the White House made my eardrums ring. The president stood from his seat and strode towards the balcony to address the crowd. The clamour faded as the president came into sight.

'People of the United States of America!' he boomed. 'Over the course of history, America has distinguished herself as the indisputable leader of the globe. We are the strongest of all the nations! Everyone gathered here today should hold your head up with pride, for you are a member of our glorious nation! But even the strongest face problems, and it is through solving them that we prove our right to lead. Please bring your hands together for the director of the Department of Health, Mr Augustus Doudna.'

My grandson rose from his seat beside me and strode to the balcony. I felt a swell of motherly affection as I watched my grandson stand before billions as they applauded him.

He addressed the crowd with a regal tilt of his head. 'Thank you, Mr

President,' he said, 'For giving me this opportunity to share my thoughts on our situation.'

The crowd stifled their applause, eager to hear the words of the director.

'With all due respect, I disagree with Mr President's statement,' he continued, much to the confusion of his audience. 'It is not I who will lead you all to victory. Every single American gathered in front of the White House today will contribute to the victory that awaits us.

'America, like all other nations, is currently facing the problem of overpopulation. I won't bore you with the statistics, but it is fair to say that we must act now. I propose a solution to you that will eradicate overpopulation in no less than ten years! For years, humans have tried to seek a solution to this problem through the advancements of technology. However, this is not only unhelpful but also counterproductive.'

I leaned forward, intrigued at the solution my grandson would propose.

'Our medical services should be suspended for those without the superior genes that true Americans have. Sir Charles Darwin once said, "Only those who learn to collaborate and improvise prevail". It is undeniable that we Americans possess the most advantageous genotypes!' His eyes scanned the crowd beneath him, daring anyone to disagree.

For a moment, there was complete silence. I held my breath and looked at the crowd, trying to anticipate their reaction. Then, they burst into applause. I grinned and felt overwhelming pride for my grandson. He appeased the fear of millions of Americans and gathered support for his solution.

Overpopulation would finally be solved! I truly thought that he would save our nation. The citizens of America clearly thought so too. He probably did as well.

We were all so foolish.

⁂

Staring at the old photo of my grandson, I inhale deeply. The plastic surgeries and medication that my grandson had advised me to take did wonders for my appearance but did nothing to mask the eyes of someone who had experienced all the world had to offer.

To my grandson's credit, the years that followed his announcement brought peace rarely seen. Statistics showed a decline of population in the states and an increase of resources and overall IQ of the citizens of America. Environmentalists no longer blamed overpopulation for the decline of natural resources, and politicians no longer staged debates over the topic of overpopulation. It was presumed that my grandson's proposal truly solved the problem. I believed it as well. The evidence was clear. The world had no reason to doubt his solution.

It was only through an unfortunate incident regarding my great-grandchild that led me to be aware of the ramifications of my grandson's plans.

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'Mrs. Douna, Mr Augustus would like to see you,' a servant said nervously.

I smiled placatingly at the servant. 'Where is he?'

'Mr Augustus is currently on the porch waiting for your answer,' the servant responded. I frowned. Augustus usually contacted me with holograms from his office.

'Let him in,' I said. I heard the door slide open as my grandson walked into my house. His footsteps were unusually fast-paced, conveying a sense of

urgency I had not seen in a long time.

'What is it, Augustus? Is something bothering you?'

'It's about Charles, grandmother,' he stated, pacing around the house like a caged tiger.

'What happened to my great-grandchild?' I asked, fearing the worst.

'The hospital performed a few tests on him, and the results showed that he suffers from autism and Huntington's Disease,' he replied, visibly agitated.

Huntington's' Disease was an inherited disease, so there was a huge possibility that Charles would not meet the criteria of the health department, and thus would not be entitled to medical service. 'Have you found a solution regarding this issue?' I whispered.

'That is why I came to consult you,' he replied, turning to look at me. 'I trust that you are familiar with the procedures of CRISPR genetic modification technology?'

This confused me. Why would he mention CRISPR in this situation?

Taking my hesitation as a no, he explained, 'CRISPR-Cas9. A nuclease part of bacteria's immune system. It is composed of two strands of RNA, one of which contains a sequence of genetic code identical to the sequence of DNA that it will cut. Cas9 unzips the RNA and attaches one strand, cutting the DNA sequence away. It will try to repair itself, but this is error-prone, often resulting in gene-disabling mutations. This CRISPR technique could be used on humans and in fact, all organisms—'

'Of course I am familiar with CRISPR,' I snapped. 'What is your point?'

'We might be able to use CRISPR to genetically modify Charles' genes. We can disable the allele responsible for his Huntington's disease and autism!' he finished, a slight gleam in his eyes.

'No. I will not allow this,' I said flatly. I could not believe that he was considering this. All governments had placed strict bans on genetic modification of the human genome because of potential ethical implications. Genetic modification technology had improved immensely over the years. Scientists could now modify any genotype. Without the precautions of the government, the technology would have led to severe social inequalities—designer babies could be created, laws could be bypassed—the possibilities were unimaginable.

Augustus leaned over the coffee table and gripped the armrests of my chair, his face mere inches away from mine. In a calm voice, he spoke. 'Are you suggesting that we do nothing while your dear great-grandson gets rejected by the medical authorities? The solution to this problem is one phone call away!'

My initial anger and shock faltered as I considered his words. Deep down, I knew this was wrong. In the end, my affection for Charles overcame by anxieties, and I nodded mutely to his suggestions.

Augustus leaned back into his chair and spoke quietly. 'I do not wish to break legal boundaries, but I refuse to see my son in such a pitiful state purely because of the law. Please bring Charles to the lab tomorrow morning for the operation. I'll see you then.'

He straightened his trench coat and walked out of the house.

The next morning, I gripped Charles's small hand tightly as we walked towards the lab. We weaved left and right through the maze of alleys before us, our hurried footsteps echoing throughout the small trails. I could see the lab. It was a towering building in which scientists once worked tirelessly to push the boundaries of scientific technology.

Suddenly, a cold hand gripped my leg. I looked down to see a small boy. I dropped a spare coin into his muddy hands. He gave me a toothy grin and

scampered off. Not giving the boy much thought, I went into the shelter of the lab. I expected a deserted building full of dust and unused equipment but instead found myself surprised at the number of people inside.

'Mrs Douna?' I turned and saw a female scientist of small stature clutching a small clipboard. 'Please follow me to the operating area,' she instructed, turning to walk away.

'I didn't know you were so busy during this time of the year,' I noted as I caught up with her.

'There are a lot of patients on the waiting list for operations, Mrs Douna,' she answered sharply. 'If Mr Augustus did not request on your behalf, you would have had to wait for months, maybe for years before you got your turn.'

Looking around, I saw kids and adults waiting in front of the operating rooms. Every single patient here was rich, including Charles and me. Why? My query was answered when I received the receipt of the operation. The number on the paper was absurd, to say the least. Only the rich could afford such expensive genetic modification surgery. Some did not have the most advantageous genome, so they were not entitled to medical services. Using their strongest weapon, their wealth, they used genetic modification to overcome their natural incapabilities and meet the criteria of the medical department.

But what about the poor? Did they get the chance to use genetic modification? Reality came like a slap to the face. Poverty made them incapable of affording the highly priced genetic modification technology. All I had believed in—natural selection, survival of the fittest, adaptation—suddenly became meaningless. Facades faded, and I saw human nature for what it truly was. The social hierarchy of humans was not determined by advantageous genes or the ability to adapt to changes. It was determined by wealth, and wealth alone.

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My conclusion proved to be correct. Several decades later, the people that were denied medical service started a large scale revolution against the injustice of the system. They had also been unable to pay for genetic modification. Augustus was arrested a few years later for selling genetic modification technology in the black market.

I saw him off as he was escorted to prison, where he would spend the remainder of his life. His parting words were, 'Equality? In this world, you only get equity.'

The government was desperate to placate the rebels and proposed a compromise: those who had reached or surpassed the age of one hundred would be eliminated, regardless of their status and wealth. Being over five hundred years old, it was reasonable that I was first on their list.

Ever since that day at the clinic, the guilt of being alive has filled me with shame and disgust. I never forgot the little boy. The innocence in those wide eyes did nothing to protect him from the fate that was forced upon the poor. The guilt haunted me so greatly to the point where I found myself counting down my days. The day I die will be the day that our society has achieved true justice and equality. I am evidence of the absence of equality. I smile at the thought. I have had more than my fair share in life, and now it is time.

The clock strikes twelve. I hear footsteps outside the window, followed by hushed whispers. Recognising Charles's voice, I pretend to sleep on the couch.

'Mr Douna, I regret to inform you that your great-grandmother's elimination will take place in one hour. Because of her age—'

'Spare me the talk! You know that this won't happen under my watch!' Charles' voice drops to an angry whisper. The door opens and he peeks through

the door. 'Good. She's asleep. Now make your way out of the house before she wakes.'

As I open one eye, I see the blurry outline of Charles and the official. As he prepares to walk out the door, Charles whispers something to him and slips a stack of paper into his palm. Patting his shoulder, the official turns to leave, oblivious to one of the papers fluttering down to the floor. My eyes widen as I see the thousand dollar bill.

The album falls to the floor with a resounding crack. I recall Augustus's parting words. 'Equality? In this world, you only get equity…'

AGNOIA

Sabrina Wong

In front of a beehive, a scout bee flies in a figure-eight. Its dance sets in motion the flight of the worker bees. They fly in search of the flowers described by the scout, their keen sense of smell guiding their approach. Their arrival is a wave which turns the patch of flowers into a buzzing centre of activity. Honey bees hover lazily among the petals, collecting nectar. In one flower, a bee wriggles into a gap in the petals. It darts out of sight for a moment before it returns to peer over the flower's edge, deciding on its next destination.

For too long, they had ignored the problem. Whether it was in innocence or selective and purposeful, ignorance was the problem. I believed that it would be

the cause of our end. My fears proved to be founded when honey bees were brought to the brink of extinction.

Honey bees are the most efficient pollinators. They enable plants to bear fruits, seeds and offspring. Scientists had warned of their extinction over an extended period of time, but even our collective cries were insufficient in spurring society into action. If they had understood the importance of honey bees, things would have been different.

Colony Collapse Disorder was the start, where colonies of honey bees began to disappear from their hives. Later, we were able to trace and explain their sudden abandonments. Use of neonicotinoid-based pesticides were the leading causes of this disorder, damaging a bee's navigation and nervous system. Another reason for their disappearances was the activity of parasites weakening the hives from inside, causing the hive's eventual collapse. Other contributing factors were labelled under the umbrella term 'human impact.' This phrase referred to factors such as extreme weather brought upon by climate change and crop monoculture.

Governments started to worry when the number of hives, worldwide, shrank to two thousand. Following an invitation, my colleagues and I presented to the American government about the effects of bee extinction. The first effects would be decreases of plants reliant on insect pollination. While this did not seem threatening at an initial glance, I explained, as seventy per cent of crop species were cross-pollinated, this would cause a ripple effect. Animals who eat such plants would also begin to die. Soon after, their predators would follow. Missing elements would cause food webs to collapse. Similar series of events would have large impacts on our everyday lives. I exemplified this by bringing up almonds, an insect-pollinated plant. Almonds are commonly fed to cows, which are important in dairy and meat production. In the final stages following bee extinction, global

starvation and the decay of the Earth's topography would happen. The government responded to our explanation with reactions of shock, anger, and denial. Before the conference could dissolve into disarray, I stepped forward.

I informed the committee that we were already delaying these dismal possibilities with robotic bees. However, I warned, we would need to address the situation with a more permanent solution. Preservation was no longer an option; the loss of honey bee populations had been on an exponential rise over the years. Now, the rate of decline was no longer manageable. Their extinction was inevitable.

We introduced two possible solutions. The first solution was to continue the development of robotic bees. For this solution to be viable, the androids would need to become more cost-effective and efficient. The second solution was to restore honey bees using de-extinction technology. To prevent a recurrent extinction, we would also have to use genetic editing to strengthen their resilience. After a brief pause, I asked for their support and funding so we could explore both paths.

My plan was met with silence at first. Then, a member sitting in the back, whom I presumed to be one of the seniors, got up and cleared his throat. He said they would need time to come to an agreement and dismissed us. I struggled to hide my exasperation. It was not as if we had many options going forward.

The wait for their permission and support did not take long. Upon their notification, I gathered my colleagues in our planning room. The board was a web of problems, ideas, questions and images of what we considered relevant. As usual, I found myself drawn towards an image of beekeepers. My father had once been one. Sadly, their importance and contributions were becoming a distant memory as time passed; nothing more than an echo of how our relationship with

nature once was. It was a painful reminder of how we as a society have forgotten the importance of nature to our evolution.

We divided ourselves into two groups based on specialities. One focused on the robotic bees, the other focused on the de-extinction and reengineering of bees. I worked with the latter. I had prior experience in working with the once-extinct passenger pigeon. This project would prove to be more complex than my previous task. Not only did we have to produce many bees in a limited amount of time, but the causes of bee extinction still remained, profound and hard to remove.

With little time to waste, we immediately got to work testing the theories we had. Logically, the first step was to analyse the honey bee genome sequence. From the analysis, we were able to determine which traits we had to maintain, and how we could maintain it. Next, we had to decide which sequences should be edited to raise their resistances. Finally, we had to find what other species' DNA were similar enough to splice into the honey bee genome. Even this first step would be time-consuming. Searching for and identifying specific sequences was difficult—as difficult as finding a needle in a haystack. My colleagues and I worked day and night with few results to show for it. At the same time, we were also establishing the best approach for applying mass de-extinction. Using samples of the egg cells of bees, we conducted trials of nuclear transfer cloning. Nuclear transfer cloning involved placing cell samples into unfertilised eggs. The eggs would then be implanted into a surrogate womb.

I recall a morning where I was enjoying a rare, leisurely breakfast on my off-shift. As I flipped through the daily news, I caught sight of a headline which angered me. Under the headline 'The Bee Apocalypse Was Never Real: Here's Why,' a journalist had claimed that honey bee extinction was a ruse. The

journalist stated the government designed the hoax to raise taxes. They had manipulated statistics from credible sources to mislead readers. As I put down the newspaper, I was struck with the realisation of how big my project would become. It would not be enough to only revive and strengthen the honey bees, it would also be necessary to educate the public on how our habits affected the environment; an educational campaign would prevent future extinctions of keystone species. My recognition of my role in this upward battle provoked me to laugh out loud.

At the beginning of this task, the government took steps to slow the bee extinction. This included stricter rules on pesticides, crop monoculture, and bee handling. The most controversial was the globally-imposed neonicotinoid pesticide ban. Farmers around the world were quick to disagree. They argued about the positive impacts it has had on agriculture. A laboratory was quick to capitalise on this dispute, and before long, they had developed what they called a 'neonicotinoid-free pesticide,' marketing it as a pesticide of similar effectiveness, if not more than the previous neonicotinoids. The laboratory implied their intentions were solely altruistic. Yet, I suspected their ulterior motive was only to gain global acclaim. By the time the pesticide was proven to cause damage to honey bees and the environment, the damage had been already dealt. I wondered then, as I do now, how these scientists were willing to hasten their self-destruction in return for wealth and recognition.

A few months into the project, we produced the first of many key results. Through a review of the honey bee genome, we were able to learn what traits from similar species we could attempt to splice into the bees. Its review has also provided us with a better understanding of the unique reproduction of bees. From this, we began to make plans to use the genetic code of ants and wasps to artificially evolve honey bees into more resistant versions.

Following our breakthrough, we were met with a complication. The group working on robotic bees had concluded that it would not be a viable solution. Through intensive research, it had become clear that it would be difficult for robotic bees to achieve the level of efficiency needed. They had been successful in ironing out previous issues; concerns relating to power sources and input-reactive programming were of the past. What they had been stopped by was the inability to replicate the sociality of bees. Many overlook how honey bees used teamwork and communications to achieve their efficiency. As such, real colonies of bees would always be preferable. In light of the news, most of the scientists joined our group to provide help to the de-extinction solution. The few scientists left stayed to continue the production of robotic bees.

The extra help was invaluable in the trial-and-error nature of resurrection biology. An issue we had yet to overcome was the mass production of the honey bees. Our initial plan of nuclear transfer cloning remained our main method. It proved successful after we learned artificial hives could incubate bee embryos in short periods of time. This endeavour proved to be successful for the most part, except for the high mortality rate. Now, we faced the question of how the process could be automated.

Following the failure of the robotic bees, visions of what the world would become should we fail haunted my nights. It was made all the worse with the knowledge I could have changed our world's course. The days were no better, filled with similar anxieties and my constant internal debates. Who, or what, are humans to be able to circumvent the consequences of their own actions? What gives us the right to choose only the species that we benefited from to bring back to life?

In spite of my concerns, I remained focused on our goal of restoring

honey bees. To our dismay, halfway through our research and development, the final beehive disappeared. Even the greatest efforts to preserve the few bees we had left only slowed their extinction. This meant that we were faced with a rapidly approaching deadline. While most countries would have an emergency stockpile of food, and in conjunction with the use of robotic bees, it would just be enough to prevent scarcity, there was no time to relax, as the first instances of panic had already begun to set in.

Civil unrest had already been a common occurrence before the flight of the last honey bee. Since the government first announced the approaching bee extinction, it was the only thing ever discussed. There would always be a new article or discussion. With the influx of attention surrounding the situation, the matter quickly became controversial. Over a gradual period of time, people began taking sides. Opinions would range from its causes, who was at fault, and what the government should have done. At the time, conflicts were limited to non-physical forms.

The loss of the final beehive was the straw that broke the camel's back. The public had already been discontent for various reasons, mainly because of unpredictable food shortages. No one expected the response to losing the final beehive to be so great, to lead so many to find their worries confirmed, for conflicts to turn violent. Order was difficult to maintain as time passed, further decreasing our deadline.

Working against time has proved time and time again to be deadly. Projects alike to this one required precision. As we could not afford the slightest mistake, I found myself praying to gods I did not believe in. We had been forced to speed up our research to ensure we would be able to launch the initial bee colonies in time. In hindsight, there must have been instances in which we did not

verify the genetic edits we made, or cut corners to save time.

To the great relief of all, we were set to have our final testing mid-2028. From previous trials, we knew that genetic editing had no impactful side effects. The bees were able to pollinate, communicate, self-manage and reproduce. Furthermore, we had also been able to finalise the process of mass production, stemming from our development of an autonomous de-extinction machine. It was capable of fertilising and implanting embryos into artificial hives. A few batches would be enough to create a hive of drone and worker bees. In every four of these batches would be a special embryo which hatched a queen bee.

Our final testing pertained to the resistance of the honey bees. We exposed test colonies to neonicotinoids and parasites such as the varroa destructor. Seven out of the ten colonies were able to resist the effects of the neonicotinoids. Another six out of ten colonies were able to detect and repel parasites within the hive. Upon receiving the results, pride and excitement washed through me; but my pride was incomparable to the joyful uproar which filled the room. At once, laboratories around the world began to produce and reintroduce the hives of honey bees. The bee population flourished into both designated farms and areas in the wild.

We had dodged a bullet with the successful launch of the genetically created honey bees. Yet, within the first few weeks, I noticed irregularities, changes that we had not accounted for. Perhaps it was the way in which we engineered them; perhaps there was a mistake or imperfection in the genomes which we had overlooked, but regardless of the case, there was something distressing about the bees. I recognised their delayed returns to their hives. Their diminished honey production in comparison to projected values. They even seemed more aggressive towards humans and other animals. To my disbelief, they may even be able to

sting without causing their own death. When I raised this matter to my colleagues, they dismissed it outright. Instead of further investigation, they instead urged me to relax; after all, we had saved the world.

Which returns us to the present. I was unconvinced by their many assurances. I maintained that our decision to restore the honey bees in this way was incorrect. As one of the lead scientists, I am not free of fault. The consequences of this decision were evitable, had we taken action sooner. In our inaction, our only choice will be to resolve the aftermath.

Worrying percentages of the global population remain unmoved by our narrow escape, to further fan the flames. In fact, a few have even gone as far to use technology as justification for their actions. To err is to be human, yet I find myself wondering how much it will take to see the errors in our ways.

Ignorance is not stupidity. It differs from stupidity; the term refers to being unable to understand. Those who are ignorant are able to understand, and instead, are unknowing. I fear that we had made our final mistake. Ignorance would be our demise.

GOSSAMER

Genevieve Moore

A pair of gossamer wings glistened under the dim yellow streetlight. The monarch sharply fluttered its wings; thousands of microscopic electrical currents opened and shut its vivid azure blades. Its slender legs grasped onto the stem of a blossom, petals blackened in the harsh autumn night. Harrison observed the creature as it thrashed its wings under the golden flame of the streetlight. His green eyes flickered under his faceplate. He gazed intently at the ephemeral creature as it swayed in the breeze.

Leaves tumbled to the ground as night came closing in. He knew that, soon, winter would come.

The butterfly alighted softly onto his palm. It had been a long time since

Harrison had seen a creature the way nature intended one to be seen. One so fragile and fleeting in its beauty. His eyes looked down at his hands. The metal tendons and transmitters shone through the translucent layer of electronic skin that coated his body.

Feebly, the butterfly flapped in the palm of his hand. He raised his hand and released it into the night.

He watched as its shadow faded into the darkness.

The batting of wings echoed through tiny neurotransmitters to his brain. Deep within the metal shell that bore his brain, the nerves and neurotransmitters began to flutter like a million butterflies into the night.

He headed down the quaint and cobbled alleyway, the buildings to either side of him flooding the skyline.

Nearly a century had passed since the merging of man and machine. Harrison saw it in the blank, expressionless faces that surged past every corner of the alleyway. He saw it in the transistors and neurotransmitters that flowed throughout his body. He saw it in the blinking of eyes beneath the silver faceplates, shielded by a veil of glass.

A century ago, the first merging of man and machine began, marking the start of 'trans-humanism.' It started with RFID chips—tiny circuits implanted within the wrists of every citizen, each designated with a barcode that contained a digital passport. These tags used radio frequency signals and electromagnetic fields to exchange data. A set of built-in antenna sent and received radio waves while an integrated circuit modulated and demodulated the radio signals, processing and storing them as data. Passive chips collected energy from the interrogating radio waves of nearby RFID readers while active chips had a local power source that allowed them to operate hundreds of meters from the RFID reader.

Many industries used RFID chips long before they were adapted for use in humans. The tags tracked automobiles during production along assembly lines; pharmaceutical companies tracked drugs through warehouses; livestock and pets were identified with RFID chips.

When neurobiologists first proposed implanting RFID chips in humans, the risk of reading personally binding information without consent raised serious privacy concerns. These considerations culminated in standard specification development that addressed privacy and security issues. Cryptography methods were used to preventing traceability, for tag and reader authentication, and over-the-air privacy. Governments around the world enacted laws mandating a specific digital signature data structure for both RFID chips and barcodes that provided data, source and read-method authenticity. Scientists worked with technicians on automatic identification and data capture techniques.

Harrison scanned the RFID chip in his wrist as he headed into the building. The chip emitted a warm orange glow from beneath the thin layer of electronic skin that shielded it, as if glowing embers leapt and twirled under his skin in a fiery dance.

After it became commonplace for humans to be implanted with RFID chips, neurobiologists started researching brain-computer interface technology. They quickly succeeded in constructing a brain-computer interface that formed a direct communication channel between the human brain and an external device. The interface was designed to allow bidirectional information flow to enhance communication and sensory connection between individuals. Harrison was one of the first humans to have a small silver box implanted above his left ear.

Harrison's interface surgery was successful. His name became associated with the great flow of research papers that followed. He became the poster child

associated with the expression 'brain-computer interface' in science.

He worked closely in the field of brain-computer interface research and focused primarily on neuro-prosthetic applications aimed at restoring damaged hearing, sight and movement. Cortical plasticity, the brain's ability to reorganize itself by forming new neural connections based on individual experiences, allowed signals from implanted prostheses to be handled by the brain like natural sensors or effector channels after adaptation.

Following years of animal experimentation, neuro-prosthetics were implanted in humans. Once the silver boxes were implanted above the left ear, the hive mind was activated. There was no turning back.

As Harrison walked into the building, his silver box began to emit flashes of crimson light as it flooded his thoughts with those from the hive mind. Harrison let these thoughts crowd his mind to fill the silent void.

His footsteps echoed through the floor. He caught a glimpse of his reflection in the polished marble that ran through the hallways. He wondered if somewhere far away, his thoughts filled the mind of someone else.

Suddenly, the hive mind thoughts drifted away, and Harrison was left with the sensation of tiny prickling needles under his scalp. A wave of his own memories surged forward in his mind. He let them wash away the feeling of discomfort that hung in the air.

He recalled that day, many years ago. The glint of various surgical tools neatly strewn across the table reflected off the white walls. News of the development in creating 'citizen cyborgs' spreading like wildfire. Headlines flashing before his eyes at lightning speed. Neurobiologists had recently finished a set of experiments that they believed could aid in forming links between neurons in the brain.

The doctors had believed that by limiting the amount of emotional response in the brain, the brain could develop and form new links between neurons in different parts of the brain that would improve cognitive functioning.

Harrison was once again at the forefront of scientific research. He remembered sitting on the surgical bed dreading the surgery. His hands twitched uncontrollably. Shivers ran down his spine in waves. His blood flow slowed. The sound of his heart pumping in a steady beat as the blood rushed to his brain and back again echoed through his ears. He knew that his neural connections had formed in his brain during childhood. He knew that he had agreed that these connections be severed. He knew he would never feel again. Despite the voices reassuring him that the surgery would go well, a wave of hesitation overcame him. Then, the bright lights above his head had sprung into action and illuminated the room in an almost angelic glow.

He shuddered as he stepped into the glass elevator, lost in thought. He glided his hand over the bump beneath his scalp from the surgery. The surgeon had drawn from the concept of phrenic nerve stimulation, the electrical stimulation of phrenic nerves that control breathing. The tiny implants under his scalp numbed the emotional receptors of his brain. But his memories were always there.

Scientists had always known that there was a physiological connection between the mind and the body. A connection that seemed more concrete and evident by each day. Near constant surges of cortisol and adrenaline could throw the body off balance. Emotions such as grief, anger, fear, joy, and even mental states such as mindfulness, contemplativeness and relaxation could affect the body's biochemistry. However, for many years scientists were unsure of how emotions affected the human body.

After years of radical research, scientists identified that emotions were caused by the bodywide release of information-carrying molecules, which they found to often be in areas with no electrical neurons. Chemicals known as ligands performed a vast range of functions, travelling through extracellular fluids and connecting with selective receptors located on cells throughout the human body. Once the ligands attached, they imparted molecular messages that dramatically impacted physiological functioning at cellular and systemic levels.

Research scientists became able to demonstrate how thoughts and emotions caused distinct neuron-firing patterns within various parts of the brain. They observed how patterns coincided with chemical releases and reactions throughout the body.

In doing so, they learned that biochemical reactions to mental and emotional stimuli occurred not only in the brain, but often simultaneously and in virtually every system of the body. The brain and nervous, immune, endocrine and digestive systems were discovered to be capable of releasing and receiving many of the same ligands that often fell in the peptide group. These discoveries led the scientists to conclude that all these body systems were linked in a secondary, chemically-based nervous system. This system was intimately connected with the electrically-based central nervous system which most people were more familiar with.

Harrison had emerged from the surgery unscathed. But he had been shocked by the capabilities of neurobiology. He saw a limitless expanse of opportunity for the future of human life without emotion. Over the edge of the horizon, he saw a future for himself in the field.

Most of the changes that followed after his surgery were at surface-level only. Neurotransmitters connected his sense of touch to the hive mind at his

command. A glass veil above his eyes contained a camera mounted on a pair of glasses that fed inputs through electrodes directly attached to his retina.

He had quietly observed the changes in the human race as his own research progressed. The most recent development in the merging of humans and technology was electronic skin. Harrison was one of the first to debut the electronic skin—his own creation in the field of neurobiology. It served as a covering for the neurotransmitters, protecting them from damage. His transformation was complete at that point. He was a citizen cyborg.

In all his years working as a neurobiologist, he never thought that any of his own creations would be implemented in humans.

Harrison exited the glass elevator. His electronic skin glinted under the harsh light, luminescent. He lifted his hand and studied his creation. Peering closely, he saw the organic transistors shielded by a layer of elastic. He flexed his arm upwards, and watched the skin stretch, revealing a layer of solar cells that powered the skin.

Footsteps echoed down the narrow hallway. A light bulb flickered, casting Harrison in a brief spell of darkness. In the intermittent bursts of artificial lights, he advanced down the dark hallway.

His footsteps echoed sharply through the building, sounding overly loud in his own ears. The hive mind had gone silent.

A mirror leaned against the door of an abandoned apartment. The mirror had a patina of age over its bronze frame. The surface of the glass was freckled black. Harrison stared at his reflection in the mirror. The distorted image of himself stared back. The mirror showed him the man the world saw—what they all saw—yet he knew that was not who he truly was.

His metal faceplate glinted under the flickering lights. The metal

transistors that ran throughout his body were lustrous in the dark. Deep beneath the layers of metal, his eyes filled with memories of serenity and rage, love and frustration, ambition and fear. Yet he felt nothing.

He ran a finger over the frame of the mirror, feeling its ridges and grooves under the layers of dust.

He could sense his heartbeat, every single pound in his chest. It blossomed like a million red flowers spreading over the dead soil that was his soul. He felt the vehement pounding and pressure in every heartbeat. He could not hear it, but he could feel it. He knew it would remain forever, even as his metal faceplate rusted and his body wilted.

He approached the door.

The door was grey unburnished silver, dull with years of age. The handle was a shaft of dark, cold metal, stained with fingerprints of the many hands that had touched it before. He closed his fingers around the handle to twist the door open. His hands slipped over the rough edges and came away blackened.

In the dim light of his apartment, a body lay like a ghoulish mannequin on the chipped wooden floor. Its eyes, once blue as the rushing waves of a river, had frozen to ice.

Never had Harrison felt a stronger longing to feel. To feel for the death of his daughter.

The passage of light slowed, and the creaking of the floor silenced. His heart pounded to the rhythm of the last words she might have said.

Her faceplate lay on the ground, shattered into millions of tiny pieces, illuminating the dark wood in a silver glow. The wires and transistors in her arms were torn from her flesh haphazardly. The white wall was a burst of crimson into the night. Her body lay as if she was nothing, just flesh, blood and bones on the

cold wooden floor. Her face, so beautiful in life, was frozen; eyes unblinking, mouth slack. Her eyes held the gaze of Harrison's.

The warmth of the ages that were her love had vanished into the cold air.

Death was cruel. It seized what it could, grasping for the ones who were far too young, far too good to be taken away. The mask of death hung over the world, threatening. Death had never outstretched its hands to reach for Harrison. Now, it had torn away a part of him, the part of him that he had loved most.

He had heard it said that a person who lived fully did not fear death.

Silence lay on his skin like poison, seeping into his bloodstream and paralyzing his brain. The tensing and shaking of his limbs were useless, but he still did so. He tried to suppress what he knew he could not for a few more moments.

Silence was his enemy.

The numbness of his loss faded away. He called for her, crying out in his mind, knowing that there would never be any answer to his cries. For the first time in his life, he longed to feel. He longed for a sense of purpose, for individuality, to be someone of his own.

He found the darkness strange. He had grown used to the warm orange glow of streetlights that filtered in through the slots in the blinds. The night flooded with a darkness he could not recall seeing anywhere before. When the twinkling stars faded to darkness, it lit a fire in his soul. It burned through the drabness of the day, floating in and out of the cold and robotic mechanized life he led.

His hands fumbled about in the darkness, gathering the flakes of silver that lined the floor. He held them tightly, savouring the last bits of her life in his hands. The silence caressed his skin in a cold breeze, smoothing away the jagged edges in his soul. He released his clenched fists and let the flecks of silver fly away

into the night.

⁂

Even after a year had passed since the death of his daughter, he could not muster the courage to let go. She rested peacefully ten feet under the ground, but he could not.

Sometimes, he would look up at the twinkling stars in the sky and pretend that her glowing light had never died. He would pretend that her light still shone bright amongst the stars.

Sometimes, he would walk upon the smooth cobblestone path in the night to her resting place, but he could not cry, could not feel. So he stood, alone in the night, numb to the pain that he wished would overcome him.

He whispered a thousand words into her grave and listened for the thousands of words he hoped she would whisper back. He never felt the waves of grief surge over his skin, or thousands of thorns prickling him with pain.

He stood by her grave and waited for the sun to set and for the moon to take its place in the darkness that would begin to envelop him.

He looked into the night, searching for what his daughter had meant to say before time ran out. The moon guided him through the night; it closed his eyes and shut down his body, pacifying his fears.

Solitarily, his soul ran free into the night. His soul followed the path that she lit through the stars, wandering through the endless night, searching.

He never knew what would have happened if he could feel pain, if he could have individuality. As he stood under the vast and expansive sky, he knew that she had hoped for change. He knew that she had wanted him, wanted the world to know that they needed to change.

His hands ran over his metal faceplate, his eyes flashed to the metal tendons on his skin, his heart beat fiercely in his chest. After a year of searching for answers, he finally knew what she had wanted.

Freedom. She had wanted freedom.

As the red dawn rose over the hillside, he stood, changed yet unchanged. He would never know again what it felt like to have emotions, to have individuality, to have a sense of purpose in this cold, harsh world. As he watched the sunrise, he let her thoughts flicker to life, sending millions of butterflies soaring into the hive mind. He watched as they flickered, fluttering through the metal cogs and gears that turned in his mind.

A pair of gossamer wings glistened under the faint orange glow of dawn. The monarch sharply fluttered its wings; thousands of microscopic electrical currents opened and shut its vivid azure blades.

Harrison reached out. The creature flittered its wings and landed on his outstretched hand. His eyes fluttered under his faceplate and he watched the butterfly, attentively.

The longing he had always felt to be freed from beneath the tendons and circuits faded away in the haze that crowded his mind. He would never truly know whether the new age of humanity was for the better, or for the worse.

He opened his hand and released the butterfly into the dappled light of dawn.

RECOLLECTION

Kleio Kwok

This is how it ends.

I am sixty years old. I start to experience symptoms of forgetfulness, as the elderly do.

The years tick by. I turn sixty-two, sixty-five, sixty-seven. Time passes, as it does, for the ones who look out for it: suddenly, then all at once.

I tell myself that it is age, the tide of time etching its mark on my mind. Forgetting is a natural part of the human cycle. Despite the great scientific advancement in recent centuries, the human brain is still a vast continent we have yet to conquer.

The doctor is an old friend of mine. He conducts the physical

examinations and neurological tests. Nurses in white outfits wheel me into rooms and heft my body into various machines that take pictures of my brain.

He leads me back into his office and hands me a coloured print from the top of the stack. It is a close-up shot of the afflicted area in my brain. My neurons are in a state of decay and my axon terminals are twisted and tangled. The next print he hands me is in black and white. There are holes in my brain, and the wrinkled flesh has decreased in size. It looks like someone has gouged parts of it out with a scalpel.

He cleans his glasses on his shirt sleeve and clears his throat. 'Margaret, you show all the symptoms of early-stage late-onset Anoia. The chances increase if a family member has had the disease and your mother… You are one of the most revered neurologists in the world. You have studied this half your life; I trust that you are well acquainted with the risks.'

His voice is quiet when he says, 'There is no known cure.'

The sky gently exhales along with him. A gust of wind rattles the glass panes of his office window.

'How many years?'

He doesn't look at me. 'Ten at most.'

I stand up to leave, and he slides out of his seat to open the door for me.

'Margaret?'

'Yes?'

He gives me a sad smile. 'I'm sorry.'

The train ride home is a quiet one. Outside my window, the concrete skyscrapers of the city turn into the undulating hills of the countryside, white-washed houses with orderly backyards in neat rows. The sky has changed too, thick black fog giving way to a rosy haze that streaks the horizons.

I think to myself, *I will miss this*. I watched my mother waste away from Anoia. I was there by her side when she began her slow descent into madness. I buried her ashes in the ground and the world mourned someone long dead. I do not want to die like this, a mockery of my past self.

Over the past century, we have pushed the boundaries of science. We are standing at the peak of human civilisation; we have engineered bionic limbs and artificial organs that ensure our survival even in the worst conditions. Electricity courses through the wires that make up our veins, we run on unlimited energy, and yet—

Our attempts at achieving immortality are futile. Our minds are what will ultimately kill us. It is ironic. Our minds have established the new, superhuman age that we currently live in, but it is also our downfall.

I flip through my old research journals and reread the thick volumes on my shelves. I annotate them, formulating different ideas of how I can cure or slow down the progression of my disease, hoping to find a way to attack Anoia by studying research papers again and again. My findings are as follows:

Anoia causes enzymes to pair incorrectly. They act on amyloid precursor protein to produce hard, insoluble fragments which tend to form plaques. These fragments deposit and accumulate around the neuron, disrupting neural communication and increasing the risk of damage to the surrounding neurons.

The plaques are not the only problem—the disease also causes the microtubules in my brain to collapse and tangle. The formation of these frayed strands obstructs communication with the rest of the neural network and results in uncontrolled cell death.

I spend every waking moment poring over photographs of my brain. I read and reread the notes of scientists before me who have embarked on my quest

and marvel over their realisations. I test different molecule compounds in the hope of striking gold, of successfully targeting the growth of the plaques and tangles.

At first I am hopeful. I am certain that I will eventually find a cure, but then I learn that the tangles and plaques are more connected than I originally thought. The plaques initiate a reaction within the neuron which causes the tau protein to stop supporting the microtubules and cluster together to form the tangles. I try to devise a new strategy to attack the plaques, but they are more resilient than I first thought, and my careful attempts fall through.

Years go by and I am no closer to finding an effective drug. I hit dead end after dead end and I am increasingly frustrated by my deteriorating mind.

It is infuriating. I know which cog in the machine has made my brain go haywire, I know why my cells are dying, but I cannot figure out how to stop it, and it drives me half mad.

I think about the eighty-six billion neurons in my brain. Anoia spreads through my cerebral cortex, extinguishing its light. Entire areas dim, then black out. My brain begins to atrophy. My gyri, the bumps and ridges of my brain, begin to shrink. Contrastingly, my sulci, the grooves of my brain, widen. My ventricles, cavities filled with fluid in the brain, expand and grow. My mind is like a shrinking landscape—wrinkled mountains steepen while valleys flourish between them.

It is a morbid kind of beauty; all across my brain millions of lights are taking their last breath. They do not burn for there is no war to be waged here. I cannot run from the inexorable doom of my death.

The seasons blur into one another. Flowers bloom and wither almost instantaneously, leaves fall and decay in the blink of an eye. One year passes, then two, then three. I am still no closer to finding a cure.

RECOLLECTION

One day I am downstairs reading the newspaper when I hear the door open. There is a woman standing at the entrance. There is a large box beside her.

Upon closer inspection, we look strikingly similar. I belatedly realise that she is my daughter. I struggle to recall her name.

'Eleanor,' I finally breathe out.

'Why didn't you tell me?' she sounds angry. '*Why didn't you tell me?*'

My voice is small when I reply. 'I thought you would be happy to see me.'

'Oh, Mum.'

I stare and stare. She looks like my daughter but feels like a stranger—she is no longer the child I held in my arms all those years ago. We are in the same room but also oceans apart.

She leads me to the bench below the big tree in my garden. I think my neighbours are hosting a party. The voices of children drift over the white fences. They sing a song. I hear the cacophonous thunder of twenty small hands clapping.

She speaks first. 'Do you remember? When we first moved in, the tree was such a small thing. Look at it now.'

I shake my head. I close my eyes and blindly reach for something, a smell, a flavour, a feeling, but they are half-fledged things of smoke and dust.

'Do you remember?' she asks, over and over again. She leads me around the house and together we breathe life into old ghosts: *I left this blue smudge on the wall when I was five. Someone had bought me a box of paint and I opened it behind your back. You tried to clean everything up but you couldn't get rid of that one stain…*

I try to pay attention, I really do, but soon my mind has drifted off. 'Mum…?' she asks eventually. 'Are you listening?'

'I'm sorry,' I say. Those words don't take much effort. I say them often enough.

'Don't be, don't be. I know, I know. Patients in the later stages of Anoia find it hard to concentrate.' Her face twists, like she's trying hard not to cry. 'It's okay.'

I don't know if she's talking to me or if she's trying to console herself.

I don't know what to say. 'I'm sorry,' I whisper and reach out to hold her. We stay like that for a while before I realise that she has fallen asleep on me.

The setting sun paints my daughter in burnished gold. For a moment I think I see all the different pieces of my daughter in the rise and fall of her chest: the daughter grinning out of dusty photo frames, the daughter giggling on the broken swing set, the daughter storming out my door. Then they vanish.

After a little while, she begins to stir in her sleep. 'Oh!' She stumbles to her feet, face lighting up as if she had just remembered something important. She returns with the box in her arms. 'I brought you a little something.'

There is a robot inside. It is covered in white wrapping paper, and when I brush it aside it looks like it came out of an old sci-fi film. Its silver and copper wires glint under the light.

She lifts the robot out of the box. 'This is Sophie. She's one of those robot caretakers for people suffering from memory impairment.'

She gently places the robot into my hands. 'Go on, say hello.'

Sophie opens her eyes. Her head swivels around as she takes in her surroundings. 'Hello, Doctor Margaret. How are you?'

She sounds remarkably human; I cannot detect any distorted metallic burr in her voice. 'Hello, Sophie. I'm fine, thank you.' It feels a little odd to converse with a robot. I remind myself that, from now on, she will be a permanent fixture in my life.

'Eleanor asked me to show you something.' There is a faint whirring

sound, and I hear my own voice.

'*Life comes from a single cell. Our cells divide, grow, split, replicate and multiply; they settle into the bigger picture like a cog in a machine, each with a specific function that makes us who we are…'* All of a sudden I feel like I am twenty-five again, teaching at the small university just around the block. Students sit solemnly in front of me, entranced, as I explain what it means to be alive—

Then it abruptly stops. The memory slips from my grasp and vanishes into the hazy afternoon.

My voice is hoarse when I finally speak. 'What was that?'

'Sophie is our latest invention. We have installed a special screening device in her central processing unit. She can access the long-term memories stored in your brain by detecting the electrical currents generated by your neurons, and, through technological means, stimulate your brain to "reanimate" the memory.'

Sophie does her best. She cooks and cleans and waters my garden. When I am feeling particularly down she replays a memory or two, but we both know it is not enough. My mind is deteriorating at a pace I cannot keep up with and there is nothing I can do about it.

One day I am browsing through the television channels when I see a man in a sharp suit standing on a podium. Apart from the click and flash of a hundred cameras going off, the room is silent. He raises a small bottle of pills in the air like he is holding a child: carefully, gently, like he has the entire world resting in his hands.

He announces victoriously, '...a cure for Anoia has been found,' and the crowd roars. I can barely hear his explanation above the commotion. I pick out the words, 'Anoia,' 'plaques', 'tangles,' 'new method,' 'drug.'

I know something important has happened. I think and think, but the

exact significance escapes me, so I shut off the television instead.

A few days later there is a knock on my door. Three people stand on my porch, and their white doctor's coats glint in the crisp morning light.

The words 'ANOIA DRUG TRIAL CONSENT FORM' are emblazoned on the first page. I sign my name on the dotted line at the bottom. My handwriting is wobbly and slanted, but they don't seem to mind.

The feeling comes back. The butterflies in my stomach bloom and beat their wings. The words feel right when I tell them, 'I have been waiting for it for so long.'

The girl in the middle steps forward. She holds my shaking hands, and there is a small smile on her face when she says, 'I know.'

Sophie is waiting for me in the garden. 'There is one last message from your daughter,' she says. The broadcast plays, and the video pops up before me.

'Hi, Mum,' she says. '*I presume you've heard the good news already. Your research was instrumental to their breakthrough. They targeted the oligomers using the strategy you came up with a few years back.'*

She takes a deep breath before continuing. '*Once upon a time you held my hand and told me that we are all made up of infinitesimally small pieces so small we cannot even see or touch. You waved a hand at the dusty sky. "Isn't it astounding?" You said. "Somehow these pieces formed and clustered together to form us. In our ever-expanding universe, we have existed, we have lived. We have stopped the unyielding tide of time, if just for a moment. Don't you think that is more than anything we could ever wish for?"*'

She stares off into the distance. There is a nostalgic expression on her face, and I wonder what past memory she has brought back to life. She glances back up at the camera, and her smile is exuberant. It steals my breath away.

'This is your second chance. Live.'

The broadcast slowly disappears from view. We sit in silence for a while before Sophie says, 'It's over, isn't it?'

She smiles at me, and there is something so breathtakingly human about her that I forget she is a robot. 'Goodbye, doctor.'

'Goodbye, Sophie.'

And this is how it begins.

STORY NOTES

IMPACT

'Impact' introduces itself in a cataclysmic environment as a meteor threatens to destroy Earth. The story demonstrates its scientific details through the form of a radio broadcast that the characters utilize throughout the narrative. Acting as both a source of information for the characters and a plot device for the reader, the radio establishes the general development of the meteor as it advances closer to the planet. The purpose of the radio is to relay information while delivering it in a coherent, easily understandable format for the characters and reader alike.

2099

'2099' presents a world falling apart due to man-made climate change. Jonathan

Irving is a leading scientist who attempts to better the situation by developing the Iris, the Intelligent Reconstructible Information Systems. The Iris a product of artificial intelligence (AI), a matured concept in the world of '2099'. The plot follows a typical storyline of the AI going rogue and eradicating mankind to 'save' Earth. This raises the controversial question: does the extinction of mankind actually benefit Earth? '2099' gives a glimpse into a future brought upon by the greed and selfishness of mankind and serves as a wake-up call about what will happen if we continue heading down our current path.

BRIEF HISTORIES

'Brief Histories' recounts the fate of a world whose people have driven themselves to the brink of extinction through a frame narrative. Despite being a technologically advanced society who have may have had the means to save themselves, failure to implement such technologies ultimately lead them on a desperate search for another planet. An altruistic physicist invents a spacecraft that allows him to break the laws of space and time itself. However, in his search for another chance for his people, he inevitably causes the collapse of the universe, rendering him the only survivor of his world. 'Brief Histories' is based on the theoretical science of alternative universes, black holes and space-time.

EVENT HORIZON

'Event Horizon' establishes itself in an apocalyptic setting where a black hole threatens to consume Earth. Black holes are strange, mysterious phenomenons; a lot is still unknown about them. The approach of black holes to Earth throws civilians and scientists alike into turmoil. The author illustrates the hopeless of the

situation by applying scientific concepts such as Einstein's Theory of Relativity. The story presents a way of coping with events out of one's control, encouraging readers to accept situations for what they are.

SACRIFICE

Written as an epistulatory, 'Sacrifice' tells the story of a doctor forced to enact the lesser of two evils to save a disease-ridden city. The story takes place in the future, where a city is succumbing to chronic obstructive pulmonary disease, a non-fictional disease. Presented in 'Sacrifice' as a solution to COPD is lung transplants, a solution also existing in real-life. By turning the ordinary disease into a city-wide epidemic, COPD acts as a plot device which forces the characters in the story to make ethically questionable choices. Through depiction of dystopian society of 'Sacrifice', this cautionary tale seeks to examine the moral aspects of social classes and the philosophical aspects of human worth.

LETHAL DECISIONS

'Lethal Decisions' explores the controversial topic of the ethical consequences of genetic engineering on humans. 'Lethal Decisions' takes place in a barren world, changed by the rapid development of humans. The scientists in the story have devised a genetic editing system to cure mankind of the fictional disease, Prometheus. This system is based off the existing CRISPR technology, with a revised purpose to eradicate Prometheus. However, this version of CRISPR comes with side effects: extreme asociality. The protagonist is faced with the decision whether to undergo the operation or to uphold his beliefs and meet his death. 'Lethal Decisions' ends on a hopeful note, that good will eventually overcomes

evil.

RESET

'Reset' follows the journey of Aipian in caring for her brother Yiyong, an amnesiac. The cloaked man depicted as having a scythe and a clock represents time and appears in interspersed intervals, acting as Yiyong's observer. When a distinguished research centre offers Aipian an opportunity to both relieve her burden and restore Yiyong's memory, she is all too willing to take it. However, the deal proves to be too good to be true and Yiyong becomes a guinea pig for testing a cure for old age. This breakthrough in 'Reset' is based upon the scientific concept that the aging of a person results in the shortening of telomeres. When telomeres get too short, they are deemed senescent and thus aging and death occurs. 'Reset' explores the negative implications of scientific improvements from an intimate perspective and a conflict of the conscience in times of trouble.

EQUALITY

'Equality' seeks to differentiate the concepts of equality versus equity. The reader follows the journey of the protagonist, a five-hundred year woman who has benefitted from the inequality of society, from an individual living in blissful ignorance to an individual with a better understanding of her world and her privileges. In 'Equality', the principles of Darwinism become law to counter overpopulation. People with 'disadvantageous genes' are refused healthcare and left to die. However, this results in the rich genetically modifying their children's' genes to fit the health requirement. 'Equality' utilises flashbacks and present happenings to portray and protest against a society ridden with injustice and

corruption.

AGNOIA

'Agnoia' is set in the near future where bees have gone extinct. The protagonist recalls and relates his journey to resolve bee extinction. De-extinction, robotic bees, and genetic editing are introduced as potential resolutions. Current scientific knowledge and concepts ground these aforementioned aspects of the story. The author adjusts and develops this existing science to not only model futuristic human progress, but also to add a fictional characteristic the story. 'Agnoia' explores both the importance of wildlife conservation and human nature: how humans resolve issues, the tendency of humans to destroy wildlife, and their reluctance to learn. The central theme of the story is ignorance, reflected in the title: agnoia is the Greek word for 'lack of knowledge' or 'ignorance'.

GOSSAMER

'Gossamer' takes place in a future where humans are partially merged with artificial intelligence (AI) in attempts to create a perfect society. The story turns the theoretical ideas of implementing radio-frequency identification chips and exoskeletons into humans into reality. The story also takes the recently-emerging technologies of electric skin and bionic eyes and converts it into everyday technologies. Although merging with AI provides benefits such as access to the 'human hive mind' and enhanced cognitive functions, it would come with the loss of emotions–arguably an important part of being human. This dilemma proves its significance after the protagonist, a pioneer of AI technology, loses his daughter and struggles to feel emotions towards her death. 'Gossamer' explores what it

means to be human, particularly as technology becomes more advanced and humans become more interconnected with one another.

RECOLLECTION

'Recollection' is set in the distant future where rapid technological advancement has led to a new, superhuman era. The protagonist is an accomplished neurologist who is diagnosed with Anoia, a fictional disease based off of Alzheimer's Disease. The story uses current medical terminology to describe the different stages of the disease and proposes various solutions which are based on recent medical reports and journals. Unlike the other stories in this anthology, 'Recollection' explores the theme of hope in the face of adversity and offers a more positive view on the implications of scientific progress. 'Recollection' emphasises the remembrance of the past, but also the importance of looking forward to the future.