

## Contact Ascension First Edition

#### Copyright © 2013 Greg Stroot

Disclaimer:

This novel is inspired by and portrayed as a sequel to the novel and movie "Contact" by Carl Sagan and Anne Druyan. As such it inherits the characters, continues from the conclusion, and reflects occasionally upon the novel and movie. While the story it portrays could just as easily have been a sequel to "A for Andromeda", "The Day the Earth Stood Still", "2001 Space Odyssey", "The Hercules Text" or "Life on Another Planet" the conclusion of "Contact" presented enigmas that proved irresistible.

This story is written in the same spirit as "Contact", portraying the event as benign yet enigmatic and profoundly history altering. The motive behind the book is simply as a dedication to the spirit of human endeavour (and to get the story out of my head). It is a gift.

It is not intended as a violation of copyright and contains much original work. Nor is it seen as a profitable venture (which would need the involvement of the Sagan Foundation). If the book is appreciated enough for someone to wish to contribute to a worthy cause the suggestion is to make a donation to Wikipedia, without whom this story would have far less substance.

See: http://en.wikipedia.org/wiki/Wikipedia:Contact\_us\_-\_Donors

Everything begins with an idea.

*In the infinite quantum froth of possibility an idea found realisation* 

From the ideas' realisation came consequence

Time recorded the event and created the inevitable

Still the froth bubbled forth possibilities and created the multiverse

The child, the parent and the sibling universe; inextricably enmeshed;

*Related; twinned; coincident; differing imperceptibly by...* 

The pace of time

The nature of force

Of matter

Of being

Its own inevitability.

Some are impossible, a fleeting existence before it collapses into implausibility.

Others shine almost impossibly bright, or dimly like a candle.

Some universes are like oil and water, a gulf of impossibility dividing them,

Others gossamer close, with zephyrs of consequence exerting ghostly influence.

In some, life crests the wave of possibility, in many it then fades.

In some of these crests the idea finds embodiment in

consciousness...

*Realisation, consequence, time and then purpose.* 

Tools explore purpose, and reveal enlightenment, and more tools.

*The dance between tools and enlightenment invokes the inevitable:* 

*The tools reveal the universe, and then the multiverse* 

*Consciousness explores consciousness, and finds a new tool, a new universe* 

So it was that consciousness spawns a new universe, in a new multiverse

In the new universe was found a new consciousness.

In the new multiverse was revealed the purpose:

Unity of consciousness.

**Contents** 

**Contact Ascension** 

**Contents** 

**Prologue** 

<u>1452 AD</u>

<u>2003 AD</u>

Part 1 Noise

Chapter 1 Telemetry

Chapter 2 Schrodinger

Chapter 3 Fourier

Chapter 4 Everett interpretation: many worlds

Chapter 5 Turing Complexity

Chapter 6 Conference Call.

Chapter 7 Putabam, ergo cogito, ergo sum

Part 2 Stillness

**Chapter 8 Collaboration** 

Chapter 9 Fishbowl

Chapter 10 Skies of SKA

Chapter 11 Doors

Chapter 12 Cycles

Chapter 13 Doubt

Part 3 Awakening

Chapter 14 In Lumine

Chapter 15 Paradox

Chapter 16 Virtually real

Chapter 17 Palmer

Chapter 18 The Key

Part 4 Ascension

Chapter 19 Ellie

Chapter 20 Opposing views

Chapter 21 Recovery

<u>Epilogue</u>

<u>2028 AD</u>

<u>1452 AD</u>

# Prologue

#### 1452 AD

A fire crackled, coconut fibres smouldering, vacillating between red and black as the breeze swayed the tendrils of flame softly in the late afternoon.

Pius looked at the mountain and then back at Gili.

"You saw the blood water?"

"I could not stay long. The warriors made the mud mask, and the skins allowed nearer sighting, but it did not shield me. I saw and I left. I did not want to further anger the mountain."

"It is as we know then, we will not find peace here."

Pius looked up, smelt the air, felt the breeze, watched the birds. Finally he pronounced, "I will consult the sea in the morning. The time is good. We would leave Kuwae."

"Will we seek your new land?" plied Gili.

Pius looked fondly at his apprentice. "Gili, you will know wayfinding before this wet. You are ready, and I will need your eyes for the stars.

We will find wave shadow and river loops, if it is the cloud we find, we will show care. Bring the three seeker birds and their stock. If the land I saw when I was prenticed marks our path we will see what it holds, if not we will seek our brothers and sisters."

Gili looked with reverence at his master. "Shall I ready the boats?"

Pius hesitated momentarily and closed his eyes in

contemplation. When he opened them he seemed to have decided. "The boats are ready, for now we must sing."

Pius hummed a low note, Gili - sensing the path of the song added his voice. Pius and Gili, eyes locked, sang together. Soon Pius gestured a change and added a new harmony, Gili focused on the new verse and recognised the new path. So the chant moved between the two before Pius ended it abruptly. This time Gili began the tune, Pius now supporting his melody.

As the blue blushed through to deep violet, and the stars shone to show appreciation for their dedication, their song was perfected. The two wayfinders drew up their skins and slept. The mountain rumbled its snores. The stars spun.

+

The distance was unfathomable. Looking to the vastness of what lay before was something that did not bear prediction or planning. Still, the forces that deceitfully nudged; the orientations that shifted; the fluidity of time that revealed and occluded; the expanse that invited madness; all could be overcome by a determined mind.

It had to begin by sheer dead reckoning. Wits and adaptation were the key.

Urgency compelled them.

Departure, conflagration, no-return.

## 2003 AD

The universe collapses. Thoughts become conflicted. To savour; to sustain; to surrender? Desire and disbelief fight disintegration. The mind aches for an anchor, but intuitively knows it cannot find purchase in this mercurial state. Sensing that the dominos have begun toppling, and that perhaps

even time may be ephemeral, a new priority sinks in.

Retention; lock the observations in, capture the dream before it is splintered asunder. Commit it to a safe place, as if harbouring precious heirlooms that connect each now with every precursor. Sudden dread and a new shattering realisation: others need to be able to open the safe.

Record, replicate and disseminate the combination in case memory dissolves. Ensure access, confirm access, cross check, surrender. Savour, music, sleep. Awaken.

+

The gimbals to the Alien machine slowly wind down. Eleanor Arroway, having been retrieved from the pod, is taken to the hyperbaric chamber that will act as both quarantine and debriefing room on the USS Cremorne.

"I don't get it?" She argues to herself, "It seemed so real. It couldn't have been a dream." Her mind screams of logic defiled.

Another group joins the contingent walking down the cramped passageway; Palmer, Kent and several of the Senior Mission Operations staff that could leave their post. Ellie is bustled into the chamber and it is sealed shut.

She looks through the viewing portal at Palmer and Kent, Fisher arrives shortly afterwards followed by Willie. She protests, "I just don't get it! It felt like I was gone for about a day!"

Palmer tries to reassure her, "Ellie, you're okay. That's the main thing." She calms a little, he glances at Mission Operations controller Grant Cavendish, and he assumes authority.

"Ellie, while it is all still fresh in your mind please talk us through everything. What we saw was extraordinary, so I want you to forget any premature conclusions that may have been expressed. We only saw it from the outside. It was 'alien' and it's no surprise that you experienced more than what we saw."

She begins her story.

+

The news is relayed across national boundaries and finds its way back to the USA. Here the US Chiefs of Staff are gathered to make determination should things go joyously right, or catastrophically wrong. The anticlimactic development they now faced had been considered as a possible, although unthinkable, outcome.

"So," probed the Press Secretary, "do we go with 'we do not yet know what the fault was', or 'perhaps we have been measured and found wanting'?"

The President looked at him and shrugged, "Well we may not have drawn a blank yet. Get onto any good news we can make of it: technology spinoffs, a united world, that sort of thing." He refocused his attention onto his Security Advisor. "Michael, see if you can find a conspiracy scapegoat. Let's put up some smoke until we know what the blazes happened, or not."

... 2 years pass ...

## Part 1 Noise

"Nothing essential happens in the absence of noise"

Jacques Attali

### **Chapter 1 Telemetry**

Michael Kitz, now *former* National Security Advisor, prided himself in knowing when there was an opportunity to work a situation to his advantage. The eighteen hours of noise recorded during the first SETI Contact event could mean nothing, or it could mean everything. In a very real sense; right now it was the only thing.

Rachel's call could only mean the President was, still, watching this closely.

On a good hunch Kitz had resigned as National Security Advisor, to implicate and prosecute Hadden Industries. The change in the guard caused a reshuffle, and when the game of musical chairs concluded his former assistant Rachel had risen through the ranks to become a Deputy Chief of Staff. He had indirectly done her a favour, and she was now clearing her debts. Raising the eighteen hours in the course of their discussion placed it in the spotlight. It was safe to assume that the Chief of Staff and the President knew, and wanted a quiet resurrection.

How had he missed it?

Eleanor Arroway stubbornly asserted that about eighteen hours of alien contact had occurred, all in the seconds when her capsule was dropped from the gimbal tower of the alien machine. Its implausibility looked reckless. It was the kind of harebrained and brazen desperation you would see when the truth was unravelling.

Any tangible evidence could only reside on her personal

recording device. But when the recorded data was examined there was only noise. Eighteen hours of it, so it seemed. Kitz struggled to attribute this enigma to the Hadden conspiracy. But the coincidence of eighteen hours of static recorded on a zeroed out digital device, with much greater capacity, was disturbing.

Eighteen! No more, no less. He could understand the prosecution suppressing it, since it could only help the defence. Prosecution could probably have torn it apart as inadmissible noise, but it had not even been raised as evidence! This left any probability that this noise was a part of the conspiracy as diminishingly small. He pulled the report up on his screen and did a text search for '18 hours'. It had not been noted as being extraordinary, and had been relegated to a footnote, otherwise it might have been publicly declared during the trial. A worthwhile defence attorney certainly would have used it to substantiate Eleanor Arroway's case against conspiracy to defraud. This one fact may also have bogged the case down in the courts for years.

...A bullet missed.

The higher powers had their motives too. They probably now believed this noise somehow represented a recording of the Contact event, a recording that 'we mortals' were simply not able to interpret. The skeptic rose in him, but was unable to offer a plausible explanation.

This played over in his mind before he finally asked, "so is there any further investigation into this noise?"

Designated as a subauthority for the Chief of Staff, Rachel Constantine, placed her index finger on her chin while considering her words. "Well Michael we need to be careful not to reignite the chaos. One rogue alien contact event ought to be enough for this world."

"So it's being kept at close quarters this time?"

"We have had some pretty good people looking into it. If we find anything that is newsworthy we'll consider our options."

"And I imagine you will need an appreciation of the security repercussions, although as I am no longer the National Security Advisor I am not in a position to investigate these matters."

Rachel could see the invitation implied in these words, and was glad that the dancing could soon be dispensed with. "We believe that someone with experience in SETI and an appreciation of the security implications would be well positioned in a role of oversight."

"May I ask who you have in mind? Actually, let's not discuss this over the phone, let's meet. I think my card still has some access. Shall I drop by?"

"Tomorrow is good, 10.00am. See you then", Rachel gave a curt nod and signed off the video conference channel.

Michael Kitz smiled wryly to himself. Containment often took longer than he liked, but he was starting to see this Genie going back into its bottle, at long last. It was not that he believed the public didn't have a right to know; it was simply that they often didn't know what was good for them. Now if only he could make these scientists see it his way.

Idealists! Couldn't they see that the altruistic and simple view of the life they led was only possible because they had an umbrella of protection? Worse! They thought that their ideas were safer behind corporate patent lawyers.

One thing he had learnt this time however was that pure

science really did have a role, no matter how far out the idea... OK, he could live with that adjustment. He had to concede that some of the spinoffs from the Search for Extra Terrestrial Intelligence were worthwhile. But it was probably more luck than design, or perhaps a carefully crafted scheme of Hadden's to divert SETI, probably to launder money.

Hadden had crossed his path some time ago, and Kitz put nothing past him. His corporation was a force unto itself, almost a government. He had funded Eleanor Arroway's hunt for ET, and he would not have done this unless he had an agenda.

The loss of life in the sabotage of the first machine was a tragedy, and one that he could have averted if it could have been contained. The unconstrained chaos also provided a perfect smokescreen for Hadden. It was too convenient.

The problem was human. Large projects needed massive recruitment, this meant relaxed diligence, less selectivity, and greater profiling requirements. This in turn meant greater security recruitment and again less diligence. The resultant juggernaut snowballed on, it had no handles and simply rolled where it wanted, all he could do was protect what he could. With containment came control and now if he played his cards right some pure science was under his control.

Noise! Great! What do you do with noise?

In fact he had a good idea of some pure science he could probably get his hands on, science that may just help out. He called his friend General John Meredith at Defence Advanced Research Projects Agency (DARPA).

+

John Meredith had seen a lot of action, too much action. He had written too many letters of condolence, reassigned too

many good men to desk-jobs with disabled access. He had also seen skirmishes lost because of communications failure. He had decided that there had to be a better way. This better way had now become his passion.

It had occurred to him in Iraq. TV re-runs were going through the hotel and Steve Austin was seeing stuff, bending stuff and exceeding speed limits with his six million dollar body.

Pah! 6 Million dollars wouldn't pay a fraction of the compensation claims due to friendly fire alone. As for building a superman, that was fantasy. The prosthetics he had seen, even recently, were only marginally better than his childhood Meccano set. The mind to machine interface was moving ahead slowly though, he'd seen the videos on the Discovery channel. Perhaps the research needed to be taken a little more seriously. He knew men that had stared death in the face; some were still staring at it! they would jump at the chance of getting some mobility back.

He had set some of his staff the task of digging up research on neurological signal interpretation. If it was possible then the signals from the human mind could be translated for prosthesis control. Selling the idea to the brass was easy. It could also be applied to computer aided telepathy for signals, as well as systems and ballistic guidance. The men he recruited into the research had also thanked him for getting them away from the desk jobs. To some this was a fate worse than death. He reassured them that no risks would be taken, but that he needed determined men. John had found his own second lease on life. He found his natural skills in rallying and motivating could be directed into hope and healing rather than maiming.

John had not spoken to Michael Kitz in a while. He had a sense of distrust about anyone in the Whitehouse, and took an initial dislike to Kitz which had progressively softened. He had proved a powerful ally, and someone whose purpose was better aligned than opposed. Many of his injured men were often re-deployed to Kitz, probably because of their intimacy with certain operations, but also because Kitz was good to them. John would say they had found a mutual respect for each other. That was good enough for Kitz, so he supported John's vision. It had potential, and he liked to keep this sort of potential close by.

Kitz left a message for John to call back with his P.A. and made himself a drink. The call came back soon after.

"Michael, you called. What's up?"

"John, so how are you? How's Agnes?"

"We're all good Michael, You? Hey how's that Fredrickson kid, is he still with you?

"Sorry John, Fredrickson was a part of the team at the first SETI machine, he was a good man though. He was one of the boys that tried to grab the dead-man-switch on the bomber."

John paused a moment before he resumed. "Nasty business that, saw you on TV for a fair bit afterwards. Do you really think that Hadden had the whole thing set up?"

"Actually that is partly why I'm calling John. I need to talk to you this afternoon. Can we catch up?"

"Sure, I'm just heading over to Langley now, there's another birthday celebration."

Michael knew that this was John's code for a 'minor breakthrough'. He was still waiting for the 'Wedding celebration' which would mean a major breakthrough in the fusion of man and machine. He wasn't certain when it would happen but there was no 'if' about it, unless John ran out of support.

Some lauded that John had already 'achieved much of what he'd set out to do'. This was also code for 'the project has been sufficiently successful, is providing diminishing returns, and other projects need the funds'.

"OK, you know where to find me. I'll see you soon."

Shortly afterwards John was moving unimpeded through the Pentagon. He knew Michael had a desk he could use when required. He knocked on the door and after exchanging pleasantries with the receptionist he stepped into Michael's office.

Michael shook his hand smiling, "John, thanks for coming at such short notice."

John acknowledged this with a shrug. "Hello Michael, It's no trouble. I know you wouldn't call unless it was important to me."

They sat at an informal table with deeply set chairs that Michael maintained with mints and water.

"So," John broke the silence, "What's so important it had to be shared now, and so secret it had to be delivered face to face?"

"John, I have a recording from the SETI machine that appears to be noise. I believe it may have been a part of a sophisticated computer aided telepathic hallucination from Hadden Industries into Eleanor Arroway's machine, or it could be from an alien... or it could just be noise. Either way I could use your help.

Michael leaned closer to John.

"I believe with your support I can also help you fund your project a little further" Kitz hesitated to let this sink in. He leaned back in the chair again and appraised John as he deliberated. "Do I have your basic agreement so I can discuss this further?"

"How much further?"

"Let's just say that I'll have the ear of a fairly senior person tomorrow and I'd like to propose that we form an interim collaboration."

"Michael you know how much this means to me, I need your assurance that you're not going to let us get sidetracked. I need to know that our 'collaboration' isn't just going to transform my project into some witch hunt."

Kitz stood up and walked over to his coffee machine. He poured himself a coffee and gestured to the General who provided a simple nod. Kitz poured a second cup and handed it over. He looked squarely at General John Meredith and played his cards as straight as he could.

"John, I have no intention of commandeering your project. I still believe it has significance. But I have the feeling that we're both under the same budgetary pressures, and I've got a line of credit. Right now I have absolutely no idea if this collaboration will bear any fruit at all. What I do know is that I am going to push for the allocation of some of my funds into a verification of whether this noise has any neurosignal content. Call it a consultancy arrangement if you like."

"Okay," John knew he was now stepping past the point of no return. Aside from the funding he really needed an injection of interest. He could use Michael's involvement to foster participation from other sections. "So do you know any more than what you've told me or are you still digging?" "John, the excavation is done, nothing was found except a tooth. We need you to help us figure out if it came from machu picchu. But I will let you know if anything turns up."

"Alright, well I'll be around. You know how to find me." John stood to go.

"Sure," said Kitz. But as the General was opening the door Michael called to him; "Oh John, happy Birthday!"

"Thanks Michael", with that he smiled and left.

#### **Chapter 2 Schrodinger**

William Sharpe, 'Willie' wasn't really upset. He had been given a good seat on what was the roller coaster ride of a lifetime. No, that was an understatement; the ride of the millennium. The fact that he, as an astronomer, had suddenly found himself in the realm of telemetry wasn't a bad trade. He wasn't a politician or a bureaucrat, he just enjoyed the science. And the science had gone screaming through the roof at the VLA.

Once the SETI signal had been deciphered he had let the materials engineers try to decode the meaning of the alien blueprints, it was their field. This was no ordinary telescope they were building. His domain was the signal processing side of Astronomy, it always was. He could discern the Doppler shifts in the solar radiation of binary stars, but rather than simply slide back into quasar astronomy he had wanted a part in the play that was unfolding, even if it was a bit part.

No, he wasn't upset. But he sure didn't like all the secrecy and cloak and dagger stuff. This was civilian science, not defence, and civilian science is built on peer review and lively debate. Shoot! he could've carved a good path into defence years ago, right at the start. Maybe it was the chaotic anarchist in him that perturbed his orbit and put him on that chance celestial docking with Arroway, Kent and Fisher. The same piece of his psyche that sought after an understanding of noise, and the same spontaneous rogue that prompted him to give the finger to it and walk away when it all turned out to be a waste of time.

Once it was seen that Ellie had simply dropped through the machine the disappointment was tangible, it was on everyone's faces, and carried by many slumped shoulders. On his particular shoulders were the telemetry signals from Ellie's personal recording device, which began buffering back into the system as soon as communications with Ellie were re-established. He snuck a look, noise, it just made you want to pack it all in and go to Mexico.

There and then he picked up the backup tape and tossed it in his bag for the offsite copy. He took a Checksum of the signal, and transferred another copy over the fibrenet before he shut the system down. He wanted to talk to Ellie, to ask first-hand what had happened. She had sounded, well 'disoriented' is an understatement. Maybe she had taken a bump on the head.

When he got home from Japan a few weeks later he'd realised that in the excitement and after all the transfers he still had the offsite tape. He had neglected to lock it away at the SETI centre on the cab ride home.

Willie momentarily looked at his computer and thought it would be prudent to make a duplicate copy of the tape, just in case some stray magnetic field damaged the signal. Such a beast had almost ruined his thesis at a library book security system years ago. He would calculate the checksum later for verification, besides he might look at the data himself. He then trudged back to his car and drove to the SETI Institute.

When he parked at the centre the hubbub was already

beginning. People in dark suits, Kitz's people were milling around muttering about wasted money and that "ET had picked up the phone but wasn't taking visitors".

They were already collecting evidence for the Hadden conspiracy enquiry.

When he told them he was bringing the backup tape they said they'd look after it for him. He had simply handed it over saying it was probably useless anyway.

Now, several years later, Willie was staring at the tape copy in the bottom drawer and wondering what he should do with it. He had kept it in case he needed to bring it to Ellie's defence, but she had been acquitted. Strangely the evangelical freakshow, Richard Rank, had come to her side. He was saying that because she had found and declared her own faith through the process then she was either a hapless naive victim, or had become truly enlightened. He secretly thought that Palmer Joss must have intervened.

So now the fate of the tape needed a decision. He had looked at the data and found nothing of interest, just noise. He needed fresh, less jaded eyes to look over it, but who? Well there was that upcoming student, the one that must have Aspergers or something. He was taking Willie's classes but also doing a major in Quantum Computing and cryptographic key analysis, heavy and heady stuff.

The young man had expressed a passing interest in Willie upon learning that he had witnessed the original Vega signal. Maybe this will 'warm' him up a little, it might take some of the 'Vulcan' out of him. He smiled at the thought.

He put the tape into his shielded bag, the one he had made especially with the conductive mesh. He put the bag in his rucksack with his lecture notes. He put his iPod in the top, passed the lead through and wired himself to it. He walked out the door listening to 'The Verve.'

+

Ellie had rested well after the closure of the machine controversy. She wanted very little to do with it and had become a staunch supporter of the Square Kilometre Array, SKA, consortium. It was like something cathartic had occurred to her. She found she had no desire to re-open the SETI can of worms. Besides the SKA kept her very busy. She had to travel to Europe, Australia, Asia, and South Africa with occasional sojourns home in the USA.

Right now Ellie was in South Africa and the afternoon was moving on as she sat at her 'hot desk'. Having undertaken some site inspections she was summarising her findings. She did this from a reasonably well appointed office that she 'time-shared' with other active members of the SKA community. The notion of the desk being 'hot' could be taken literally right now. The air-conditioning technicians had arrived that morning with the wrong fan motor, and had used her phone to arrange for the correct part to be couriered out. Meanwhile, they stood about talking about the heat which was building up oppressively.

Looking out the window she could see the sub-Saharan landscape rippling. She knew the same heat would become a longing memory as the boundary conditions approaching the Martian or Lunar extremes heralded the evening chill. The inevitable association to foreign planetary systems and Goldilocks zones brought the familiar SETI spark, but without kindling there was no flame.

The day was drawing to a close. With her work all but completed she permitted herself to indulge. She could happily dwell on the SETI 'circus' but it came on with a remoteness. Interestingly she could easily appreciate the reclusiveness of Neil Armstrong. She could never really muster the dryness of Aldrin and couldn't easily come up with an equivalent response to 'what was it like?' to which Aldrin would quip 'crunchy'. She smiled to herself, fetched a glass of water and continued her musings.

Sure, the research had continued. The dislodged seat had been left out and several people had tried going through the motions again, but nothing had come of the attempts. The same fireworks occurred, the same strange fields and interferences, several variations had been tried, but no one could claim to have experienced what Ellie had.

She wasn't surprised; the transmission had mysteriously stopped after she had been a passenger in the machine. She was sure that the signal and her experience were related somehow, it was hard to conclude otherwise.

"Small moves," she'd been told. She somehow had the feeling that the next steps were not necessarily hers to forge, and that they may be in a different direction. Still that did not quieten the scientist in her. Not that her scepticism was reasserting itself, it wasn't. She understood faith now. It was more akin to a promise, one worth the time of seeing it come to fruition.

No, it was more of the investigator, the fact that something didn't quite ring true, something missed. It was a bit like the forensic matchbook that was there, but ought not to be. Or was not there but ought to...

The blood rushed from Ellie's face.

After a quick calculation over time-zones she made the call.

"Kent, how are you?"

Kent Clark had stayed on in the SETI program to direct further analysis of the machine. Kent's level head and lateral thinking had complimented his perception, and as Director of Research at SETI he had provided several insights into its nature. "I'm well Ellie. Are you coming across to Japan again? The weather is quite mild at the moment."

"No, not this time Kent, I'm just calling to ask you something."

"Shoot."

"Well we captured the entire Vega signal didn't we?"

"Yes, and I know what you're thinking. We tried replaying the signal during subsequent events and it hasn't made any difference. And If there was a signal that we couldn't detect, we can't go back to detect it now."

"Okay, so we are back to either causality or locality being wrong."

"We sure are Ellie, they can't have stopped the signal when they knew you had dropped because they couldn't have known that you'd dropped for 25 years. We've discussed this."

Ellie was now focussed on her point. "But listen Kent. Maybe they weren't waiting for someone or something to arrive. Maybe they were waiting for something to leave."

Kent had a way of using silence. Being blind he could send signals by not sending signals. As far as receiving was concerned... this transmission from Ellie obviously had him thinking again. "So... when this something in Vega was seen to have left, they simply shut the machine down. And at lightspeed 25 years later whatever left Vega, should have arrived here just as the signal was switched off to our ears."

"What do you think?"

"OK," began Kent, "so again, was it a part of another signal? Hang on! Are you saying that you being dropped in the machine allowed whatever it was to instantly leave Vega?"

"I didn't say it, you did. But maybe the humanoid in the blueprints was not us waving goodbye, but greeting hello."

"What could leave Vega, on an electromagnetic signal, which could be seen in Vega to have left because of an indeterminate event here?"

"Schroedinger's cat, Kent, Schroedinger's cat!"

+

James Frazer was significantly self aware. This hadn't bothered him, having Aspergers he struggled to even contemplate if anyone felt the same.

This seemed to be a source of some disconnection but he quickly recognised this as a circular problem. He needed empathy to determine whether his self awareness was unusual, and yet he could not empathise. If this seemed to make him a little different, then was anyone the same?

Once Aspergers was explained to him it became something that was as prosaic as having orange hair. Others had it, he had it too, others didn't seem to need the comfort of peers, nor did he. Move on. It bothered him that it bothered others but that was okay because there were enough people that it didn't bother. Move on.

Puzzles! Life was a puzzle. Obviously it would be good to solve puzzles so you could get better at the puzzle of life. When in elementary school the teacher drew the number '1' at the top of the board and went on to say that when anyone

recognised the pattern they should speak out. He then placed two more 1's below that in a small triangle, then the numbers 1, 2 and 1. Pausing briefly he then drew the numbers 1, 3, 3 and 1. Having noticed several patterns already James felt some distress. He wanted to be sure of a single pattern before he committed his answer, but with every line added he could see more patterns emerging. When the teacher placed the row 1, 4, 6, 4, 1 he could no longer stand it.

"Sir there are four patterns I can see already but I don't know which is right."

"Okay James, what are the patterns you see?"

"Well first there are the numbers 1, 2, 3, 4 just inside the 1's. Then there's the next row that counts the number of balls in the triangle on my Dad's pool table, then the next one tells me how many I can stack on top of that. The fourth is that each number tells me how many ways I can get to the number moving down from the top. I think there are more patterns in it but you would have to make some more rows for me to ..."

Heather Sparrow, curly haired and freckled in the second row then interjected, "Isn't each number just added to the number next to it to make the line below?"

James looked up at Pascal's triangle and thought about it. "But that's just how you make it, it's not what comes from it."

That afternoon James secreted home an A3 sheet. He drew an extended Pascal Triangle and began looking for more patterns. He found '11' and '11x11' and '11x11x11' hidden in the rows. He then started looking for other number patterns. He heard about, and saw Fibonacci's sequence in the patterns. He then became fascinated by the golden ratio. Soon after James was put into a different classroom. He found a support network on the Internet. This helped him to find a second opinion when he needed it. In fact this was almost like having a hive mind. He could visualise the threads of conversation, and he translated this to his own thought patterns. He contemplated whether this was a form of schizophrenia but decided that this path of reasoning did not interest him. It required empathy.

The bulletin boards he initially discovered soon became islands of alternatives: Google, MySpace, Facebook, Twitter. Now that was interesting! Not just different invocations of social networking, but different paradigms. It was perfect. He could avoid having to understand people face to face by using the layers of abstraction available. And it taught him how to relate face to face when it was required. He created his avatar in this universe and kept it very separate from his true love: maths. He was able to move on.

Mathematics was also an abstraction, one that didn't have the same chaos as the human element. Once you delved beyond the second order of human understanding it became unfathomable. Mathematics however revealed new layers of beauty, symmetry, elegance, metaphors, and when you had dug down many layers you sometimes unexpectedly found yourself back on the surface. So it was that James' life was full. He was able to relate to the world around him and the humanity he cohabitated with.

Having invited him for coffee and muffins Dr Willie Sharpe was evidently one of those not bothered. This meant no explanations, and you could get on with the real task. What was the real task? Now that really did bother him. Before that could be answered it had to be known what was real, and from "cogito ergo sum" he deftly sidestepped existentialism to understand that something really was out there, but what? Willie was waving.

"Sorry Dr Sharpe, I was in a reverie. So you are saying that this tape doesn't have any readily interpreted result. That you are happy to bequeath it to me, but that you'd like to be kept abreast of any outcome. You are also saying that you, as an expert in your field, have no idea if there is any substance worth pursuit."

Said like that Willie was beginning to wonder if he shouldn't have simply binned the tape. It certainly wouldn't make a riveting display at the SETI interpretation centre. 'No result' was a little harsh, he had tried some basic analysis, and had found some curious results. The problem was that further exploration would need an inordinate amount of computational power. This was power he did not have access to, and in fact he doubted if anything on this earth had the computing capability required. No, this needed a lateral and technology that transcended existing approach. sequential computing.

"I guess I would really just like to have a fresh set of eyes look into it before I relegate it to the garbage," he surrendered, "and call me Willie please".

He leaned over the coffee table. "Truth be said I can't even be sure if this isn't the last copy of the data that remains. I have my suspicions that the National Security Agency may have thought that the best security was the incinerator."

James considered this. "You do realise that I am researching my thesis on quantum computing and key extraction, I may not have the time to extend to this pet project?"

Willie shrugged and reached over to place the tape back in the bag. James was secretly very excited about the proposal but tried to keep his head cool. He finally broke. "So here is what I propose", he reached out to seize the tape, "I will use this data as a blind test to the technology I hope to develop. In a sense creating an arbitrary problem only to verify the answer is not a demonstration of a solution. I need to show it solving a problem not yet solved, perhaps even NP insolvent."

Willie looked up. James was frustrating but correct. Incorporating this into the research hit two birds with one stone. He could tell he was about to launch into a monologue on his project and gently, but firmly, interrupted.

"There is one more issue though James." Willie leaned forwards conspiratorially.

James gave a blank stare. It took him several seconds to realise that Willie was waiting, "Go on..."

"This tape was not made with the knowledge of the International Machine Consortium."

James failed to tune in to the lower profile of the conversation, "It's pirated!"

"Shhhh! No, not pirated. I was the head of the telemetry section, and I had my own authority. Let's just say that there were some competing philosophical perspectives, and that this became my insurance against less enlightened authorities simply burying the lot."

"Okay, so I am on the side of information freedom rather than secrets?" James liked these sorts of games, ever since he had been given the '20Qube' that seemed to always get the right answer after 20 yes/no answers.

"That's a good way of looking at it." Willie smiled and reclined a bit, leaving the tape on the table before him. He spread his hands. "We just need to be a little sensitive about the release of the results, if there are any. Some people on 'team B' might get upset that we didn't let them in earlier, but we will want the results to be known. Refuted even."

"Okay then, thanks for the challenge Dr Sharpe. Can I include the results in my thesis?"

"No problem James. Thanks for your help, I'd like to think we will have a very productive collaborative project ahead of us. I'll chat to your supervisor."

Willie stood to leave. "I have a lecture now, and if I'm not mistaken you have one too. Lets meet here next week."

As Willie and James walked toward the theatrette where they were both scheduled. He considered it interesting that the one question he would have asked was never raised... "Why me?" Evidently James had a kind of fate that he alone understood, and that it's purpose was unfolding as it should.

#### **Chapter 3 Fourier**

After six months the General called Kitz.

"Michael, I need to talk to you about our consultancy. I need to know if you can ask for a little more funding."

Interesting choice of words thought Michael. Not 'need to ask' but 'can ask'. This is a good sign. It probably meant he had found something that could be used to justify the continuation of the project. Certainly the Whitehouse thought his approach had merit on many levels: It could be funded covertly; it was funding spent in a potential vote winning area; and it was the only good idea they had.

"I'll be right over."

Kitz told his PA to postpone an appointment he had with someone called Dr Peter Ellery about anomaly trend

detection analysis in social networking. He had introduced himself as representing Hadden Industries but had been quick to distance himself from the arm previously under investigation. Evidently a lobbyist. He then had a second thought and called her again to delegate the meeting to someone else. His PA, who had several calendars she coordinated, suggested Mark Beregons. He was one of John's Signal Corpsmen who had suffered a case of PTSD. "Perfect" he had declared, and asked that only filtered calls be forwarded to his mobile.

True to his word Kitz was there in short time. The General greeted him cordially and thanked him. He first briefed him in his office.

"We have been working on a telepathic receptor system, both to interpret and to replay brain signals. For your project we initially tried simply replaying the signal through our system. It was not a big success, all the recipient recalled was noise."

"The recipient?" Kitz looked puzzled.

"Yes, We have a quadriplegic victim of a ground mine. He cannot seem to get enough of our work, well he has little else he can do. By virtue of the regularity of his immersion he gets occasional images from the person trying to transmit. He is our best subject and is progressively learning. With 18 hours of immersion if there was any telepathic signal he would have picked it up."

"You called me here to tell me that?" Kitz was not frustrated, he simply wanted John to get to his point.

"Follow me," said John.

General John Meredith took Kitz to the office of one of his staff, William Thomson, a Senior Analyst, who began his

explanation:

"Sir, there are several channels on this data. One is Audio and Video, another monitors temperature, there is radiation monitoring, and then, health telemetry which should contain heart-rate, breathing, and EEG signals."

"EEG?" interrupted Kitz.

"Brainwave data sir, ElectroEncephaloGram."

"Okay, go on."

"Well it's true that all the signals have the appearance of noise. But any signal also has a corresponding Fourier transform."

Kitz was not a very patient person and just wanted to know the result. "Are you going to be long with this because I don't have time to do a degree in mathematics here."

John interrupted, "Michael this is actually important, just bear with him. Go on Bill."

William went on to briefly explain that any signal in our world varies in time but that any signal can also be expressed as varying in frequency and phase. A signal's representation in the frequency domain is obtained by performing a Fourier transform. This transform, in a sense, removes the signal's relationship with time. The information can then be easily manipulated. The modified signal can be reproduced again in time with an inverse Fourier transform. This was performed routinely at the centre to heighten the contrast of the telepathic transmissions.

"Okay so let me get this straight," said Kitz. "I don't get all this stuff about domains. I do get the idea that a signal, like a heartbeat, can be squashed into a frequency universe,

changed, and then thrown back into our universe to sound like the Beachboys. What has this got to do with the noise?"

John stepped in. "The way it was explained to me the first time is that this is kind of like reading a book from the side. You get the whole picture all at once in rough detail, and then you fill in the gaps."

"Okay so where does this lead us?"

William was extremely unhappy about the oversimplified analogies being bandied about. He knew that the basic concepts provided enough clarity to persevere, and for a college graduate to validate.

He carefully went on, "Well, there are some other principles involved here. This is a rabbit hole that you really don't want to go down that involves the prime numbers, Pascal and Sierpinski triangles, and fractals. Anyway, doing a quick forward transform gave me nothing, but when I did the inverse transform on a part of the signal I got this."

He clicked a 'play' icon on his computer. What came out of the computer speakers was a series of muffled clicking sounds with noise in the background. It could have been a heartbeat.

Kitz was starting to get interested, "Go on."

"There is something there, but the sheer computing power and storage needed to perform the inverse fractal calculation on the entire signal is extraordinary. And I don't know what the final signal might imply based upon what you just heard."

"Okay then," said Kitz, "so you know the story behind this don't you?"

"Not really sir, I've been told this is 'need to know'".

"John, you should brief him", suggested Kitz. He turned and strolled over to look out the window while the General filled William in on the high level details.

"Well," began John, "This signal of 18 hours was the only evidence left after something happened in the blink of an eye. You may remember the Contact event?"

The analyst's eyes opened wide in sudden recognition. He certainly did recall the event, and the controversy that followed.

"I gather you do," continued the General. "This is the telemetry signal of Eleanor Arroway. Our current suspicion is that it has some form of telepathic signal, so you see that it is a matter of some importance and relevance that we find the truth behind this signal." He paused to glance across at Kitz. He then focused back on the technician. "It is also necessary to maintain absolute secrecy. I can fill you in on any further details you need."

Kitz stepped back into the dialogue. "Quite right General. Before we release this information to civilian research we need to know the repercussions. We don't want another fanatical sabotage. Gentlemen, what do you need to take it further?"

"Michael, there is nothing that can compute this except a massively parallel supercomputer." John paused while Kitz absorbed this, and then continued, "unfortunately all systems with this capacity are dedicated to other tasks."

"We'll see", said Kitz.

+

Rachel Constantine was power rich and time poor. The feeling that the exercise of subtle nuance could somehow direct the behemoth of a multi-trillion dollar, multibillion person world was intoxicating. The collation of accurate information was the hardest part, there were simply too many human variables. There were the pressures that came from everywhere for her to use her power and influence for the 'greater good'.

Her judgement relied upon information. This was a currency that was traded by lobbyists for funding, resources and political priority. Invariably the success of any request relied upon the ability for a champion to articulate their case. This distorted proper governance; where badly articulated cases may be more deserving of support than some well presented ones. So it was that delegation was her strength, a skill carefully honed to enable her to harvest a situational perspective.

She often resolved these difficulties by trialling seasoned champions in lost causes. She likened this to the shaking of a cereal box; it created a more homogeneous packing. Besides, sometimes a little humility helped to temper the spirit, as did the removal of comfort zones.

Kitz kept coming back to her though. If ever she felt the need to keep her enemies close it was with her former boss Kitz. He was now sitting on the chair opposite her desk. He was fighting his way back up the ladder. He feigned concern. It was that annoying look he gave when he knew you wanted answers, and also knew he was integral to them.

"Michael, please don't patronize me. You're saying you want access to the Square Kilometre Array computing system for an indefinite period to perform a calculation. Yet you won't explain the problem to me. I appreciate that this is related to our previous discussions, but I imagine it will mean taking the arrays offline on systems where we have no jurisdiction."

"Rachel, I have contacted several of my friends on this. The South African contribution to the array is floundering. They need to replicate the Australian system for their dishes and they can't get their Project Management Office into shape. What I'm suggesting is a rescue team, they don't have their acquisition system ready, and the supercomputing facility is all but done. I would like to perform some 'bench-testing' on a massively parallel calculation. In return we help with the acquisition project. Surely it's in our interests to support this international initiative?"

Michael Kitz reflected upon the conversations he'd had. It was interesting how with the hint of new funding the project administrators had eagerly come on board, even under his non-disclosure terms. The SKA project needed grease, he needed their wheels, and he doubted they had given a second thought to the terms. The Memorandum of Understanding wasn't airtight, but it didn't need to be.

Rachel also reflected briefly; Dangerous! Kitz seems always to be several plays ahead of her. He had carefully lined up both of their ducks. He was now merely presenting the gun to her. She could now yield some assistance to a project that several lobbyists had nagged her incessantly about; there would be no loss of SKA computing time; the South Africans had probably already been sold on the idea and expectations would be already rising.

Rachel knew he had planned this meeting well in advance. She also knew the risks he was taking in calling on his friends, and now knew that he had the wherewithal to subvert civilian resources to his agenda. With his background as Security Advisor he could also not resist doing so covertly. She could have raked him over the coals for overstepping his authority, but he could possibly argue that he hadn't. There
was only one thing she could do; let out more rope. This could result in one of two outcomes: he could hang himself, or he could succeed and she would win either way. The hope was that they would learn about the nature of the signal.

Michael was no fool, he could see the reasoning behind the need. The original event had failed to send a human, or procure an alien, and the conspiracy argument had obtained no traction. The public rancour for administrations on both sides rankled and festered. The resulting boil needed to be lanced by showing a tangible result. Furthermore, the President needed to be the one to release it. The next election depended upon it. Time was ticking away.

"Okay Michael, I'll see what I can do. But, I don't want it to run overtime, and I want absolute assurance that you will keep me informed."

"Of course! I'll send the necessary documents over tonight." He knew he was backing the Deputy Chief of Staff into a corner. He needed to give her something to make the decision as simple as possible.

"Rachel, I think what we've pulled out of the system so far could be a heartbeat."

+

Several months passed. Kitz felt over exposed.

"John, we've had the computing time for several months now. How much longer do you need?" Kitz was nervous. This was taking longer than he was comfortable with, and the longer it went on, the greater the potential for him to be implicated.

"I'm told the calculation is 60% done."

"And how much of your own jobs have you pushed through?"

"20% as we discussed."

"They're saying that the array is ready to feed in John, unless the array-feed gets hit with any last minute delays we have no more time."

"I'll surrender our 20% Michael. I'm hearing that our line of exploration is hitting roadblocks anyway. But you need to assure me that any outcomes of this other avenue of research will be accessible to our team."

"I'll see what I can do John but please understand that utilising civilian research avenues will reduce any opportunities to exclusively militarise the findings. You need to begin executing the contingency we discussed; partitioning off the military applications from the quality-of-life civilian applications."

"Agreed, let's get this done. I will separate the conjoined twins. Going forwards we will have Gemini and Sagittarius. I will hibernate Sagittarius till we know what comes of Gemini. Speak to you later."

"Bye John. Don't worry, it will all be okay."

"I hope so."

Kitz waited for the audible click and listened well after he should have hung up. Perhaps a residual habit of the wiretapping days, he only hung up after he was certain there was no secondary click.

"So do I," he finally said, and hung up the receiver.

### **Chapter 4 Everett interpretation: many worlds**

One of the most tedious flights ever was the trans-Pacific.

Even worse was to the west coast of Australia. Western Australia was chosen for the Square Kilometre Array because of its isolation, not in spite of it. Ellie had a keynote to deliver at an astronomy conference to be held in Perth to signify the conclusion of the SKA infrastructure construction phase. After settling in to her hotel she set up a recharge bank in the kitchen for her devices, all the while cursing about the lack of power points in the bedroom.

After the flight over the Murchison site and the guided tour through the computing facility Ellie was at the International Centre for Radio Astronomy Research. The room, with its panoramic south facing windows overlooking the lush Nedlands campus of the University of West Australia avoided the direct sun. The pearlesque clouds against a blue sky hinted at the South Westerly wind and the afternoon sun glimpsed through clouds gathering over the Indian Ocean. The Eastern-most wall of the room had a faint tinge of orange as the day was drawing to a close.

While the trip was somewhat formality Ellie wanted to ensure she was up to speed on everything before she provided her Keynote speach "What do you mean 'bench-testing'? Hasn't the cross validation already been done? I thought you were now supposed to be providing data for parallel batch processing on the South African facility!".

The Director of ICRAR, Professor Henry Miller, felt equally uncomfortable but not terribly surprised. "There is some argument about needing to optimise the algorithm for the larger aperture and wavelength."

"And you buy that?"

"Well, no. The telescope structures are bigger but the signal is simpler. They don't have the same reliance on a super-computer as our Australian effort. Also, any signal they wanted bench tested would need cross validation, and it simply isn't necessary.

"So what is this all about then?" Quizzed Ellie.

"Well there are only so many massively parallel supercomputers, and most are busy. Maybe someone is borrowing some computer time?"

"It's only borrowing if you ask, and then intend paying it back."

Henry knew that Ellie was a seasoned campaigner. Money was secured on political favourables and imperatives as much as it was on merit. He also knew that Ellie needed to see transparency if she was to brand herself with the SKA. He leaned over the desk and went on, "Apparently the payback is coming from your government, we can't identify what analysis is being done, and our liaison says it is simply 'historical data'."

"Can you provide me with terminal access?" Probed Ellie.

"I thought you would never ask." Henry smiled. "I have a terminal in the postgraduate research area downstairs that you can have access to. Here are the credentials. I'll have our postgrad student Viet Ng help out where he can". He handed over a post-it note.

"Thanks," said Ellie. This was a little too contrived. First the invitation out of the blue, and now a console access account. She suspected that she was being called upon for help. "So shall I let you know?"

"Please do," said Henry. "And again thank you for coming, it really is an absolute honour."

Soon afterwards Ellie was staring at the monitor. This was not

astronomical data. She did not know what the signal represented but it was not anything she'd seen. The recursive nature of the calculations was akin to an inverse transform which was possibly astronomical correlation of data but the data set was huge.

Although she knew enough to be dangerous she was not a computer science whizzkid. She copied the source data file to a cloud drive and resolved to give it to Willie. She set the sharing permission for his account and sent him an email.

He may know what to think of it.

+

In the darkness of the hotel room kitchen a light illuminated the roof, and Ellie's mobile whistled.

Incessantly it nagged the space around it. Willie's face on the mobile smiled incongruously, oblivious of the fact that it was being ignored.

Somewhere in the data silo's of the mobile network provider a virtual machine had a timer subroutine interrupt the call. The parent program popped off the stack and examined the flags left by the subroutine. This supervisory program then called upon another subroutine and subsequently pushed itself onto the stack, further pushes and pops were made that resulted in registering the calling number and the opening of a message file in preparation. A pre-existing file was opened and a digitally encoded voice took on its original analog form, it was then re-transcribed into a VOIP format and transmitted over the network to the caller.

"Hi you've called Ellie, please leave a message. (where is the stupid hash key?)" beep!

A stack pop reverted control back to the original call and then

another subroutine which began buffering the incoming analog signal.

"Ellie, I think you need to call me. This is about the gift you sent. I just thought you'd like to know that I already had one which I passed on to a friend recently. So it came as a pleasant surprise to get an exact copy from you."

Willie completed the dialogue and allowed the supervisory routine to be dissolved into entropic oblivion. This left him just as perplexed as before, he couldn't dispel suspicions that James had not been as discrete as he would have liked. He screwed up the paper containing the carefully worded message and turfed it in the bin.

How on earth would the noise signal have gotten from James to Ellie though? The signal Ellie provided had exactly the same Checksum as the signal he had given to James. This meant they were derived from the same origin, and being digitally encoded there was absolutely no way of determining its source as being James, or ... Kitz.

He decided he had to ask James, so he sent an email asking for their meeting to be brought forward. Being a creature of strong habits he suspected that James may go into a tailspin, but he simply had to know.

No reply came, so the next day he finished his lecture 30 minutes early. This he did with the commitment to leave a set of questions on the subject forum page with six encoded audio signals for six teams. The actual audio signal was required to be written down as a type of capture the flag competition. To make it interesting the team that came first would have their time score reduced incrementally by the time of the team who came last.

He allowed them the 30 minutes to determine their teams

and post this team breakdown to the intranet page. The chaos that ensued was an exercise in the need to collaborate, and be inclusive of less advantaged players to spread the strengths evenly. He had this material all geared up for a few weeks time, and would normally have released it as a revision exercise. It now bought him the time he needed.

James was in the laboratory. He looked dreadful. He had obviously not slept. Several bowls, plates of pizza crusts and a half eaten 'Shazlix' roll sat on the table. A 5x5 Rubik cube sat half solved atop the stale food. James looked up from a monitor and pushed his 3D glasses up onto his forehead as Willie entered.

"Hi James," said Willie as he binned some of the old food and stacked away a few of the plates.

"Don't touch that!" murmured James under his breath.

"Look at me James," said Willie. "You NEED a break."

"Grunt," much of the confident demeanour of James had diminished, and the lab - once immaculate - now resembled an untidy child's room, and it smelled terrible.

"You need some air", Willie said softly peering with concern at James for a possible negative reaction.

James glanced over at some of the mess and at the various pieces of electronic equipment. He eventually shrugged resignedly, deciding that resistance was pointless, and that Willie was probably right.

"I should clean this up first," said James.

"Later, let's get some breakfast," said Willie.

He guided James up and waited outside while James locked

the door behind him.

Breakfast comprised of coffee and a fruit salad. Willie insisted that he needed something a little more wholesome and representative of the actual time of day.

Willie began; "You haven't slept for ..."

".. about two days, I think," completed James. "It's pretty hard to tell actually since the room is shielded against just about everything, and no daylight ever comes in. I tried putting a radio in there once. I couldn't get a single station, not even the campus..."

"Shhhhhh, eat."

James ate, and Willie sipped his coffee. Once James had regained some of his blood sugar levels, and his composure had returned in part, Willie continued.

"So what is the driving force behind the reclusive turn?"

"Oh, I haven't told you yet have I? I have some interesting results."

Willie's head went into a spin. Something he hasn't told me! Results!

Of course! this self imposed isolation means that he has been too busy to have divulged the signal. And yet there is another copy in the wild. Maybe he had been hacked. Maybe the results too!

The feeling of deja vu was flooding back. He recovered, "You can tell me in a minute. I need to know how vulnerable you are in your security protocols".

This was like a slap to James. He looked at Willie flatly and

said simply, "Not a concern".

Willie considered his options. If his confidence in his security was to be believed there was no point telling James about the second signal yet. "Tell me about the results then."

"There is something seriously strange about that noise you gave me."

"What?"

"It seems to be adaptive! It has a key. It was fairly easy to find in the first iteration and..."

"and.."

James scoffed down the last of the fruit compote and yoghurt and grabbed the paper cup of coffee. "Come with me, I'll show you what I mean."

He got up and they left the cafeteria. Minutes later they were back in the lab. James scurried around and finally uncovered a chair that Willie dragged over to the screen. James' disorganised chaos in the lab was not representative of what he did with the computer. He did struggle to find a second pair of 3D glasses but he finally navigated quickly to the file that he wanted.

"What I'm using here is a Quantum Computer. It's a massively parallel Turing machine that uses the concept of parallel universes to..."

"Hang on, parallel universes are only theoretical aren't they?" Willie was not about to let James launch into a recital of his thesis.

"In the sense of universes that have different constants? absolutely! Maybe parallel realities is a better phrase.

Although there's no proof, Everett's 'many worlds' interpretation of quantum mechanics is compelling . You just need to look at the double slit quantum eraser experiment."

The interruption worked; James appeared to have lost his thread. Finally he looked at the screen in front of him, and put his glasses on.

"Anyway, this is the input model for your noise problem. The solution event occurred in about a millisecond. It represents the rough crypto-analytical equivalent of finding a 128 bit AES encryption key. With such a huge sample space it allows a smooth representation in q-space. It looks something like this," James loaded the file and used the mouse to slowly set what resembled a landscape of valleys and mountains into a gentle rotation.

"Okay," began Willie, "I get this. Your quantum computer solves this by finding the lowest valley or highest peak, which must then represent the key, and it does so by tunnelling through the 'mountains' with a kind of fuzzy logic."

"Yep, but that's not the strange part," said James, pleased to have such a good student. "The solution is this," James clicked a checkbox in a floating toolbar. Immediately there was a mapping of colour codes over the landscape. "Do you see it?"

"Not really," said Willie. "Am I missing something or is there more than one peak or trough that would be a solution?"

"BINGO!" shouted James gleefully. "This is extraordinary!"

"But what does this mean?"

"Well," began James, "If you had to write a letter to your grandmother to tell her whether her cat was alive or dead, but you didn't want anyone else in the family to know, you

would want to encrypt the letter right?"

"Yes, I guess so. Grandad may be happy it was dead and Gran might want to smuggle another cat in before he knew," Willie laughed, James didn't. Willie just put it down to the aspergers. He didn't even want to consider joking about explaining encryption to his grandparents.

"Yes! so here's the thing. One password opens the letter to reveal that the cat is alive. But what if there was another password that revealed that the cat had met with a truck?"

"Is that possible?"

"It is called an encryption collision. It is almost diminishingly improbable in the encryption systems we utilise. In the case we have here there are literally hundreds of collisions, maybe thousands. But it goes further. When I take any key and apply it, this is what I get." James pressed the play icon on a program. What emanated from the speakers shook Willie to the core. One pulse, two pulses, three, five, seven... He pressed stop.

"Now, if I use a different key we get one, two, three, five, seven again, but, the noise is different each time."

"What does this mean though?" Willie was now very shaken.

"Well, its almost as if the signal is providing some sort of adaptive system. Something that will react differently to different stimuli".

+

Xien Wu Hsu was called into the sterile white office.

"I understand the Kien Mu system has provided some insight Wu Hsu. Please let me know of the revelations. "Master, there is much discussion in relation to Quantum Mechanical Computers and adaptive processes. It seems that this may be the answer we seek. It is worth further exploration. I will go and see if it can be brought to our worthy cause."

"Go," consented Xien Wu Hsu's master, "much depends upon it."

## **Chapter 5 Turing Complexity**

There was that noise from the kitchen again! It was different though, more alarming this time. Pensacola dissolved, and the noise continued.

"Eugh! Okay, okay I hear you".

Ellie threw on knickers and mumbled something abusive about timezones. She reached the phone, swiped the alarm off and saw that she had missed several calls. Knowing that she'd be likely to miss the business hours of anyone that didn't know her new timezone she resolved to get to her voicemail over breakfast.

She found the usual array of breakfast cereals downstairs in the hotel restaurant, and elected for an alfresco cafe out on Hay Street. Half way through her ham and cheese croissant and orange juice she called her voicemail.

At about 9:30am Ellie noted down the calls. Willie, Willie, and Willie again. She tried to read between the lines. He had said he 'already had a copy!' How could he? He was not associated with the SKA. His second message was just, "call me". His last call was perhaps the most frenetic. He was mumbling about prime numbers and signals. She tried to reconcile this against her picture of Willie: often irreverent but deeply honest; replete with a repertoire of bad jokes but good company on a long night of scanning wide open skies; dependable and capable; apt to lose his cool under pressure but quickly recover. There was also his deep suspicion of the military. This bordered on paranoia and was in part due to his upbringing. His parents were involved in military research which Willie did not talk openly of. Ellie suspected that the outward superficial bravado was also a distraction to assure that he did not divulge what he knew. It may also have been to present a visage of superficiality that assured he was not asked.

But prime numbers and signals? She checked the date-stamp of the message in case it was an old one she'd forgotten to delete. It was definitely last night, besides Willie was there on the day of the first signal, why make a song and dance by voicemail. The most likely interpretation was that he had already been provided this signal in recent research - she had gathered this much from his first coded message. From there Ellie surmised from his second message that he had either found something new and interesting, or he wanted Ellie to associate this SKA data to the Contact event.

Could there be a second event? This was unlikely as Kent had her number, and he would certainly have called. It was also unlikely that any new SETI signal would be given to the SKA project. No, this was connected to the SKA data she had recently furnished him.

That's probably it. Willie is trying to warn that similar interests exist over this new signal. What a dreadful job he did of it though! A code is meant to fly under the radar of noticeability. This communique has alarm bells and urgency all over it. What did he say again? Something about having explored new systems to analyse prime number signals.

Either way there was something deeply disturbing in it. Maybe the 'urgency' was the message. Ellies mind began a meandering path through the realms of possibilities. She absent mindedly finished her croissant and ordered a coffee and a muffin she didn't want. She chewed the muffin top and then suddenly decided that, despite the time, she needed to call Willie. She switched the SIM card on her phone and then called his mobile.

Willie didn't recognise the number. It was late, and although he wasn't sleeping he hesitated before he took the call. "Willie here."

"Willie, what's with all the cryptic messages?"

"Ellie, thank goodness! I need to show you something over here. When do you get back?"

"Willie, please just speak your mind, you're starting to freak me out."

Willie knew that the lines all over the world were tapped for key words on terrorism and espionage. He spoke with a deliberate obscurity, unsure of where the lines of the NSA, FISA and the FBI blurred. He was, however, a little more comfortable with an actual phone call; a voicemail had a definite half life of persistence.

He spoke hesitantly. "Ellie, I copied your sample signal and tried to trace it to a source. I used a spectrogram technique I developed to match time variant stellar signatures. It was a long shot but I applied it against the signals I've acquired over the past ten years. I found a match."

"That's fabulous Willie. So what is it?

"It's a little complicated Ellie. How did you come by the signal?" Willie tried to keep his voice casual.

"Lets say that I found it undergoing a comprehensive analysis

in an unexpected location."

"Well I catalogued the signal about four years ago when we were just concluding our other project. I deleted the file from your cloud server after I copied it by the way. It was quite large. Anyway, I believe you're probably familiar with the signal too.

"In what way Willie?"

"Well it represents about eighteen hours of data acquired near Vega."

Ellie nearly dropped her muffin. "What?... Just give me a second." Ellie focussed herself on the facts and decided that there were too few of them. "Can I call you back?"

"Sure."

Ellie placed a call to Henry Miller.

"Henry, I need a favour. Do you have a video conference call facility on campus?"

"Sure we do, Ellie."

"Can I use it to conference with an associate in California? I think I have a lead on our mystery signal."

"That was quick! Can I sit in?"

"Probably, let me confirm. Can you let me know the conference centre availability?"

"Ok, I'll call you."

"SMS would be better."

She then called Willie again. "Willie, I have a possible video

conference call facility available. Can the person who gave me the signal come along for the ride?"

Willie trusted anyone Ellie did, but he also felt that some of what he wanted to discuss should be for her ears only. How ironic, that he was now starting to feel secretive. He justified it by the logic that he would want it released when it was verified and could no longer be commandeered, ridiculed or suppressed. Yet he needed the facility to show Ellie the data from James' research. Things were going so fast again. He felt that they now had the jump on anything Kitz or DARPA could know, and he wanted it to stay that way.

"Who is the passenger?"

"Professor Henry Miller, he's leading the SKA development effort. He is aligned with UWA which houses the conference facility we will be using." Ellie could feel that whatever was happening needed some care going forwards.

Willie knew that Ellie's choice of a University conference facility was a good one. These generally had a moderate degree of security since they needed to accommodate discussions of patent applications and research that was often Commercial in Confidence. He decided that he could reveal a little more throughout these subsequent separate phone calls. Each one in isolation may not mean much. He knew that Ellie would be able to piece them together though. This would allow Ellie to make better tactical decisions.

"Ellie," he began, "the signal has also been analysed by an undergrad with a new kind of computer. I need to discuss our speculations on the result."

"Okay Willie, I will take your lead on this, we can separate the discussions of SKA analysis and yours. I will ask for some discrete time."

"But what's there to say to SKA?" asked Willie.

"I think we will have something to talk about Willie, trust me on that. I'll send you the conference availability when I have it, but lets pitch for 5:00pm tomorrow over there, that would make it 9:00am here. Can you check your facility and prepare?"

"Sure."

+

Gaven Shorten was really no longer in his comfort zone. This was something he knew he must acclimatise to in order to attain the success he aspired, but his capability was beginning to run a little thin. He had led a charmed life: born in the right time, at the right place, in the right family. From a humble beginning at university he had found the right course, the right project and the right supervisor to create the right innovation, again at the right time in the right place. This was drawn to the attention of the right people who made the right offer.

He soon moved beyond the hands on development of amorphous data linkage structures into a coordination role. He was fortunate to have a team that only required a light touch. Since then he had risen through the ranks of Hadden Industries to emerge as a technology scout. The grand patriarch SR Hadden tapped into Gavan's pragmatism to counterbalance his bold, brash and strongly intuitive modus operandi. He saw some measure of himself in Gaven but without the humble beginnings. Perhaps he could impart a sufficient measure of vision for Gaven to assume the reigns of an enterprise now ready for some pragmatic consolidation.

But Gaven was not from the same mold as Hadden. Hadden had an uncanny ability to be in the hotspot of opportunity

through feeling, and then trusting to the gravitational pull of it. His intellect would then invariably contribute its mass and create an epicentre from which waves of change would emanate. Gaven could see innovation, could smell it, could sense it like a snake with its heightened perception of smell or infra-red. But he had to be close, and it could not be obscured from his senses. So it was that the SETI program would have flown under his radar. Even in the ensuing discussions with Hadden the involvement in SETI was conceded to be highly speculative. Gaven knew his limits, although he also knew that with Hadden's death his role was now quite different. He was no longer expected to watch his patron and help build the ship. It was sufficient simply to know how to navigate it.

Hadden had provided the charts and instrumentation for him, and it was just such a piece of instrumentation that was now pinging him.

He looked at the report on his desk. The chinese Kien Mu system had raised a 'diagnostic error' and had core dumped. Chinese engineers had been trained by Hadden Industries but could not make sense of the diagnostic. Under their standard procedures they copied the core dump and restarted the system from the latest known good snapshot. They then invoked their Hadden Industries support agreement who sent two of their Engineers to investigate.

While the Chinese exercised their right to carefully monitor the investigative process, its diagnosis was beyond any but those in Hadden's Machine Learning development team. The core dump was analysed, and a hotfix applied. Apparently another self referential loop had been inadvertently created. This had previously been explained to the machine owners as a conceivable outcome when a machine learning system was issued parallel lines of enquiry, and each line of enquiry calls upon the other. The only thing that could be done was to identify the difficulty and enter it into the computer's Koan Table. It had been demonstrated that some of these loops could be potentially very large, and through neural reinforcement could become very thick. The Chinese, flattered at the acknowledgement of a Taoist philosophical term understood this. By extension they also understood that when considering a circle it did not matter where it was broken.

So it was that few questions were asked when the loop elements were taken for testing. Hadden Industries were required to analyse these koan tables in order to mitigate the occurrence of these diagnostic errors.

In this way the entry referring to Eleanor Arroway and Quantum Computing came to the attention of Gaven Shorten. He invoked SR Hadden's protocol, and set a train of motion into play. His first call was to his operations area.

"Please have Evgeny come to my office as soon as possible."

He then called on the special projects team to initiate contact with Eleanor Arroway.

### **Chapter 6 Conference Call.**

Henry had not batted an eyelid when it was requested that Ellie take some time alone with her colleagues prior to his joining in. He suggested he would arrive 30 minutes after they had started, and to let him know if there were any difficulties or delays.

Willie and James tuned in on time, James was just completing a tweet and quickly squirreled away his phone as the cameras kicked in. The initial formalities comprised of introductions between Ellie and James. Willie then gave Ellie the story of how he came by the data. Ellie seemed interested in what had happened to the original offsite backup tape. She asked him if anyone had actually signed for it.

James then briefed her on his work, Ellie came up to speed very quickly. She excelled in quantum mechanics at MIT, which led to her maser work at Caltech, this was however a completely different application.

James touched upon the research into Computational Complexity. This was an area of research that harkened back to Alan Turing in the development of Turing machines in 1936 and led to the cracking of the Enigma codes of the second world war. Chaos theory and computational complexity sparked a resurgence in the field and quantum computing slotted straight in.

Ellie asked James about the difference between chaos and complexity. Willie sighed, and gave Ellie a stare while imitating a movie director motioning 'cut' with his index finger. James immediately took a liking to Ellie and went on to explain that chaos theory is emergent and describes how complex systems are extremely sensitive to initial conditions. Computational complexity, by contrast, was exploring the limits of problem simplification.

James illustrated with the example that two prime numbers can be multiplied trivially to gain a result. The prime numbers that create the result however cannot be trivially found knowing only the result. At this point Willie had had quite enough and stepped in to redirect the focus. Ellie smiled at Willie's discomfort. She was also keen to get to the nub of the story, but was enjoying the interplay between these two.

After being presented with the outcome of the preliminary analysis Ellie quickly came to appreciate the implications of the findings, even though it was peripheral to her field. In her subconsciousness and with the talk of an adaptive signal something began to tickle her scientific nerve. The reappearance of prime numbers was unsettling, it was like a Newtonian deterministic clock ticking the seconds of some elusive universal computer.

She recalled her recent conversation with Kent. She also reflected briefly on David Drumlin whose untimely death left her in the role of the first voyager on the machine. It left her feeling again that the next small moves may be someone elses to take, with her role evolving to one of guidance. She decided there and then that she had more to contribute as a mentor.

At the appointed time Ellie opened the door for Henry and performed introductions. "Professor Henry Miller, I'd like you to meet Dr William Sharpe."

"Call me Willie."

"Please call me Henry."

"... and James Frazer. James is a postgrad student with Willie. Coincidentally the signal being analysed at SKA is also being analysed by James."

"Hi," wave.

Ellie continued. "I gave your data file to Willie to see if he could identify it. Willie and I go back to the SETI program in its infancy where he was involved in signal analysis. Willie can you bring us up to speed?"

"Sure. Ever since SETI I have built a catalog of signals through a library of spectrograms. This library allows a rapid ID of any signal and included the telemetry signals from Ellie's encounter in the SETI machine. This is where we hit the match." Henry had at one stage installed SETI@home on his desktop and understood how hungry the signal analysis could be. He had assumed that this was some innocuous hijacking of resources. This now seemed partly verified and was probably some over exuberant postgraduate student.

"Pardon me Willie," interrupted Henry, "you say you are analysing the signal at your facility. Could you also have a researcher analysing the signal at our facility?"

"Not a chance!" and "No way!" were echoed simultaneously by both James and Willie.

Willie continued, in a more conciliatory tone. "Our research here is contained between James and I, primarily James. James you should give a quick abstract."

James cleared his throat and chimed in, "the research project is in solving BQP equivalence to QMA complexity problems or P=NP with Quantum Computing. For this we need a suspect BQP sample, this is where Ellie's signal comes in. The signal is not the root of my thesis, it is simply an artifact that I am analysing."

Willie stepped in again, he felt this was enough 'blinding with science'. He provided his own summary. "Henry, we saw the signal as an intractable one and thought we'd try to solve it with James' quantum computer. The origin of our signal was from the offsite copy following the event. The original international Machine Consortium data was seized during the conspiracy inquisition. If you are curious how this signal comes to be with you, I suspect that it came via the data retrieved from the IMC."

"You are probably correct, and it fills in some of the gaps we have." Henry then continued. "Just to fill in your gaps I was recently told of a quid-pro-quo arrangement between the South Africans and the US government, one that appears to have worked too well. The receivers are nearly done as a result, and the 'bench-testing' time on the computing facility is now in the critical path. We are coming under increasing pressure to yield results."

Ellie was thinking rapidly now. She had a rough plan in her head and this next part would require some delicacy. She mustered up all of the lessons learnt in the SETI rollercoaster. Firstly, she needed a small teaser. "Willie, at this early stage of your research are there any indications that you may be able to solve the conundrum of this signal?"

James was about to answer but Willie overwhelmed him. "We've had some small successes, it needs more work and funding."

"And would it be useful to see if conventional computing could solve the problem?" Ellie was fairly certain it would. Willie and James voiced their agreement.

Ellie now redirected her attention. "Henry, if the SKA is no further behind than you would have been without the project management help, I would like to request the calculation be allowed to run its course for a short while. Perhaps we will learn who is involved. If the calculations are aborted now, everyone would simply go to ground. Besides, the signal is astronomical in nature after all."

"Ellie, how long are you asking for."

"Just let me find out who is behind it, let's say a fortnight."

### Chapter 7 Putabam, ergo cogito, ergo sum

Ellie would be the first to acknowledge she was not a very good politician. She had however been through some considerable induction throughout her involvement in the International Machine Consortium. Ellie had seen the building of the machine as an outside observer when she proffered her candidacy as the voyager.

She figured that politics was like religion, you had to feel it rather than analyse it. Even at university she had known political majors, and while they had obtained nice tenure positions at universities few had ventured into political careers.

No, politics was a game for those with the gift of the gab or the well connected. In that sense both needed each other. The well connected could influence a spokesperson. One obtained the power, the other the fame. Drummond was certainly an interesting blend of both of these traits. Ellie had learnt from the best. From the day he stepped in to take control at the first press conference for the announcement of the signal she understood Edison's quote that 'good fortune was where opportunity meets planning'. She also knew that much of the credit to Edison should have gone to the likes of Nikola Tesla.

She did some self critique. She was now well connected. She could ask for an audience with anyone of power, given sufficient justification she might even be able to access the President of the US.

In hindsight she had never considered what the repercussions of a successful SETI program might be. Her focus had always been on the fronts of technology and the battle for funding. She had the feeling that something was different on this occasion. Was this what it felt like to be in the drivers seat?

With this new perspective Ellie again looked at the facts. If someone in a government entity was trying to subvert an international research project for their own agenda it meant two things: that they needed resources that they were struggling to gain; and that they were thinking like bureaucrats. This 'noise' was entirely foreign, it needed an approach different to simple muscle.

Her first call had to be to Kent.

Kent was perplexed, the signal had been analysed, of course. Nothing had been found and the data was kept in an archival area awaiting new developments. While the facts were perhaps not commonly known they were not deliberately withheld. There was approximately 18 hours of digital noise written to a system capable of thousands of hours, the remainder of the storage was utterly blank.

The data could actually be obtained from the SETI Institute by filling in a request form and having it authorised. Only one group had been successful in their request for the data. SETI@home had seen a brief new resurgence. Desktops had evolved to become Laptops. The battery conservation capabilities for laptops dynamically lowered clock speeds and power consumption. As a result SETI@home Mk1 could no longer claim to be 'green' in its recovery of 'lost' cycles. With laptops rapidly being replaced by tablet technologies the project received its death sentence.

There came some donated off peak time on corporate servers, this and the advent of cloud elastic computing meant that cheap computing time was available in off peak periods. Through philanthropy and grant money the use of distributed computing technology found application in SETI and humanitarian goals such as pharmaceuticals. The SETI research yielded no result, and as was required, the source file had been subsequently deleted from the servers.

Kent confirmed that if someone had the data they had to be a part of the IMC, or a higher authority. Ellie made a point of asking Kent to see if the offsite copy of the tape was still in the archive. Of course the data may have been copied whether or not the tape was there. Ellie considered the possibility that while taking something might be hard, a thief may consider returning it as even more difficult, and unnecessary.

Her next call was to the Whitehouse Deputy Chief of Staff. This was a little trickier but Rachel Constantine had warmed to Eleanor Arroway.

Rachel liked straight shooters. Sure Ellie was not a person to put into a diplomatic mission, but if her indulgence in hands-on science could be excised she could have been considered as Science Advisor to succeed David Drumlin. At the time of Drumlin's resignation and demise she had been excluded through being an IMC candidate. Ellie was also totally preoccupied in the post event inquisition. Unsurprisingly, she showed no political aspirations after this grilling.

Even now Ellie was not going to be offered the role of Science Advisor. A rapid evolution of stem cell research meant the President needed a balance of Ethical and Scientific guidance in a different discipline. Although she would certainly have brought a great branding to the administration, this was not Ellie's home ground.

One thing was now apparent. With the character building and political seasoning of the IMC behind her, Ellie's file read 'has become interestingly moderate'.

As Rachel contemplated this further she thought it likely that the actual contact event had perhaps purged Ellie of her fundamentalist scientific fire.

So now rather suddenly, Ellie wanted to speak to her. She

wondered if she simply wanted advice on a good dress shop again. Unlikely, perhaps she needed another grant.

"Put it through Alice."

"Eleanor, How are you?"

Ellie felt her out cautiously but directly, "I'm well Rachel, I've been busy key-noting for the Square Kilometre Array in sunny Australia."

"Ahh, I guess you have been to a few airports then." Rachel was now conscious that this was either a strong coincidence, or that she was in for an interesting conversation.

"That, and ribbon cutting," was that hesitation she could detect? "I've also had a chance to see some of the early results from both sides of the Indian Ocean."

Rachel knew that Ellie knew something. She now had to choose whether to play dumb, or play the game. But Rachel had been playing the game too long to be outmanoeuvred by Ellie's novice skills. Besides, information is a two way street, she would learn more from Ellie by feeding her a little bit. "So tell me Ellie, are our project managers getting the South African telescopes a little further along now?"

"Ahh yes," Ellie felt a thrill, she had just learnt about the telescopes, but Rachel had just taught her so much more. She needed to keep the momentum. "It's going so well in fact, that the computing facility is anticipating the conclusion of some interesting bench testing being performed."

Straight shooter, she enjoyed this. "So tell me Ellie, why is this bench testing so interesting?"

"Well, no-one seems to know why it's being tested. What is really interesting though is what it's being tested with." Ellie decided that the silence now over the phone was an answer in itself. She simply waited for the Chief of Staff.

Rachel was awestruck. Had Kitz let himself get sloppy? Either someone on Michael's team had leaked this, or it was a strange and risky game plan of his. Did he think himself beyond reach in South Africa, in the same game as Ellie?

Then she understood something Kitz had said about hiding things in plain sight, in actual fact this was a pretty good plan. The data was astronomical, the facility, also astronomical. Kitz had provided plausible deniability. She had to take her hat off to Ellie though.

"Really? and what is that?"

"Well, it turns out to be the data for approximately 18 hours of telemetry obtained during the contact event." Ellie was certain Rachel knew more, how was she going to flush her out? She was almost certainly not going to concede anything she didn't need to. Perhaps she needed some assurances, and some time to make it look like she had investigated.

"Anyway it has people involved in the Array thinking about the coincidence of the government funding and the signal analysis. The cynicism runs so deep that some people are thinking about switching it off and seeing who complains." She had now played her Ace. If there was a vested interest in seeing the analysis continue it would hopefully be flushed out.

"And what do you think Ellie?"

"Well I'd like to see the result. In fact I think it might be a project that I could support. If only I knew whom I was supporting. Of course this is all speculation. I'd hate to think it would go beyond you and I." There, the seed had been

planted. Would it grow now or later? She waited.

"Ellie, I'm so glad you came to me." said Rachel, "I will see what I can find out. In the meantime it would probably be best to let the analysis run a little longer. See what you can do. When are you back in town?"

Rachel was glad Ellie had not pressured her. She needed to think about this. They made arrangements to catch up the following week.

Ellie breathed a sigh of relief. All this intrigue was heady stuff and she felt a little drained. It was very late but she needed to get some clear skies. She jumped into her hire car and drove north just beyond the light pollution from the Perth CBD. Sitting on a northern beach she watched half a sky of cirrus cloud. It resembled the edge of a torn sheet of tissue rent from the southeast to northwest horizons. It gradually dissipated leaving the wheel of the Milky way Galaxy playing slowly around her like some roulette wheel placed by Niels Bohr to illustrate improbability.

She thought of Palmer. It had been a while since she had spoken to him.

She pulled out her mobile and called. She had some credit available, and since she was flying out tomorrow it may as well get spent.

"Hi PJ."

"Ellie, it's nice to hear from you. What's up?"

"Hmmm, just now it's night, I'm between Sirius and Canopus, with Achernar over on my right, and I'm on a balmy beach. I have sand between my toes, and the waves are about to drench my shoes," she said as she reached out to rescue her sandals. Returning she added: "Need more clues?"

"Are you finally off on an overdue holiday?"

"Not likely, I just have some SKA work that took me here."

Palmer did some quick time calculations, "Well that puts you in South Africa or Australia; my guess is Australia. Hey, I've got some plans to head over there sometime soon. Perhaps you can show me your beach, and I'll show you some stations."

"I hope I can find it again. I forgot my sextant. Can it wait for later? I'm heading back tomorrow." Ellie contemplated whether she could indulge in a return trip with Palmer. A wave broke nearby, it punctuated the conversation and she followed the work segue. "How was your day?"

"I debated Richard Dawkins, it's set for televising next month."

"How did it go?" She felt ambivalent over which polarity she supported. She felt obligated to support Palmer while feeling some sympathy for Richard.

"Well I opened on a topic I picked up from anesthesiologists recently. I asked him if it was faith, or a scientifically understood fact that he would wake up tomorrow morning with the same consciousness." Palmer paused, "He hit back saying he felt sure his biology would maintain his initial conditions, and that a near facsimile of himself would wake up."

Ellie gave a small laugh and then suddenly stopped. This had to be the most absurd notion she had ever had. 'Adaptive', 'prime numbers', 'ticking'....

Palmer waited for a moment and then asked, "Ellie, are you

still there?"

She was thinking at light speed now.

"Palmer, how do you think the spark of life jumps across the femtoseconds of time. Do you think it exercises its free will either side of the gaps or between them?"

"Ellie you feel your spirit the same as I do. You tell me. My gut feeling would be in between."

But Ellie couldn't. She wasn't sure yet but she had a theory. A theory that she wasn't even sure that she could test. She had to find someone else to discuss this with. She needed to know if the signal, the one currently being poked and probed like some microwave background radiation that should not have been there, was in fact the frozen representation of a consciousness. A consciousness that had a set of static initial conditions, and was ready to be adaptive at the next tick of the clock.

# Part 2 Stillness

"Stillness is the only thing in this world that has no form. But then, it is not really a thing, and it is not of this world."

Eckhart Tolle

#### **Chapter 8 Collaboration**

She had been forewarned.

Rachel had called Ellie and suggested that it was perhaps time for her to reconcile with her nemesis, that some interesting ideas could be discussed, that her contributions and guidance would be appreciated and that some moderate resourcing could be available. She also said that she wanted this research to be controlled and released by the Whitehouse; that Hadden Corp were not to be involved; that the intention was to make findings public, should they not be considered a security risk; and that if she agreed with the proposal Kitz would have final veto on publication. Ellie had been unambiguous in saying that she did not want Kitz involved in the influence of research direction at any level.

Rachel had also required more transparency from Michael Kitz. When she had eventually been furnished with the report she convinced herself that Ellie should now assume the helm, and felt confident that this trust would be reciprocated. Certainly the current science advisor had entirely the wrong background, unless stem cell research came into it somehow.

Kitz, while not a convert, had faced the inevitable conclusion that there were events and conundrums that were not able to be simply dismissed from his perspective.

He had intimated to the Chiefs of Staff the presence of a heartbeat in the final signal. Being tantamount to a promise it was satisfying, and career saving, that it turned out to be just that. There were further riches in the breathing; alpha

rhythms: the induced cyclic rhythm of the various annuluses of the gimbal: audio and six seconds of video showing the inside of the pod. It included showing Ellie releasing herself from the seat in mid-drop, an action which saved her life. All of this would have been perfect evidence for his conspiracy theory. Perfect, except for one stumbling block: the Fractal Transform of telemetry into 18 hours of noise in some 'frequency space' was performed in 6 seconds of real time. Yet it took eight months for а hot-off-the-press supercomputer to unravel this mathematically. How and why? It did his head in! If the recording was performed in real time, then did the whole pod exist outside of normal time during the six seconds? Where the blazes is 'outside of normal time'?

He had reached a new impasse, and Ellie was the only person in the world with the knowledge and first hand experience. With the Chief of staff now breathing down his neck he knew some humility was in order. He relinguished his control over the research, and initiated the contact with Ellie's team. Knowing the subdermal feelings festering since Ellie's indictment he asked John to sell the idea to her. Containment was crucial. but the balance between inhibiting communication progress and security was a difficult line to imagine. Lesson two: let the research dog have more leash than the defence dog.

Kitz was not intending to completely relinquish the project though. He requested that the NSA place a watch on it. This would allow any connections to be strung together by Mark Beregons team with their new data mining and machine learning systems. He asked for the analysis to include the last six months. His rationale was sound. This whole business implied the existence of a rogue copy of the SETI data, one that did not include the embedded metadata of the public version. This data would go right back to the original event and had much more serious implications.

Although he could not deny Eleanor Arroway's right to the data he could not be sure of her security protocols, his were watertight. If events had conspired to converge Ellie's team with his separate efforts, it was conceivable that the facts surrounding the project could be derived independently, possibly by a foreign power. Thanks to Hadden Industries the Russians, Chinese, Europeans, and who knows who else, were all armed with similar machine learning infrastructure, and they may already have extracted connections. He needed to know where the seed was planted. A six month gestation was sufficient, although also quite demanding. If something showed up it would justify a larger window.

+

A knock came at the door.

"Ms Arroway, may I come in?"

General John Meredith stood at the office door to Ellie's hot desk at Howard University in DC. Ellie wasn't sure how to react. She also wasn't sure whether to expect Kitz or someone else. Evidently it was to be someone else.

John waited at the door with his military cap under his arm as a token of respect. He had taken a gamble. He could have come in "civvies", but could not in all honesty pretend to be anything other than military.

He seemed alright. Ellie beckoned. "Come on in." She stood and went to shake hands with the General.

+

The fear was palpable. This was no drill.

When the perspiration became a threat Sergeant Frank Valetti stopped running and crouched down behind the wall. He was soon joined by his team.

He signalled for Josh and Arnout to go right on five, and for Craig and Marek to circle around left on eleven. He indicated that he would provide covering fire.

Fingers count: one, two, three, burst, five, burst, seven, burst, burst, burst, eleven, burst, thirteen, burst, burst, check. He risked a glance to confirm the health of his squad and was relieved to see they had made it.

As he often did he contemplated home and thought of his step-sister, turning seventeen in two days. He set himself a goal, as soon as he could get back to the DSN hub at base he would call and wish her a happy birthday. Whether superstition or not he often set a goal like this, as if invoking a prescient moment provided either a protective aura or motive to survive. With any luck this sortie would soon be over and he would soon be back at base. Right now he had to focus on how he could get to the next point some nineteen or so metres in front of his current position.

'Never be predictable', this had been drilled into him by the Staff Sergeant, a veteran of many theatres and tours. Again he signaled to his team; they knew what to do and followed the same firing sequence from the flanks. Frank counted with it. As anticipated, while the sniper had not picked up any rhythm he knew that the barrage of fire would precede a quick advance. The sniper declared himself expecting a target and was met with a further volley of gunfire from Josh and Marek. Once they had roughly located the source of the gunshots Arnout and Craig began a quick new volley. His cue on twenty three came. He was off, run, sidestep, no distant shots came, slow, sprint, dodge, nearly there, slide ... click.

#### ... Darkness

He woke up startled and short of breath from his recurring nightmare. The phantom pain in his left forearm was there. He tried to bend his mind to convince himself that the pain wasn't real, which seemed to provide some relief. He couldn't tell if his assertion represented imaginary or absolute truth. For all he knew he could be in excruciating pain and the last vestiges of sensation were being issued through what remained of his C3-C4 spinal injury. He doubted it. He had injuries elsewhere on his body, and these never bothered him. His quadriplegia was complete.

The relief he obtained was only possible through his 'DBS'. The Deep Brain Stimulation device placed in his brain served two purposes. It was able to alleviate his pain through electrical stimulation, but it also had the latest Neurochips. This technology enabled both the reading and stimulation of parts of his brain. Through the plasticity of grey matter, and no insignificant force of will, Frank had been helped to train his mind. Repeated stimulation of the electrodes generated new signals which traversed through the hypothalamus to the pituitary gland. This manufactured the welcome endorphins, and pain relief.

The system had also been augmented to try to provide mobility and sensory input. The successes were minimal but gave him a purpose as well as hope. He could learn to manage his pain, and that was something. He was also the perfect subject for the research now being conducted.

John was there before him. He swallowed some air to get the breathing started.

"Hello son," said John.

Frank took some time to collect his thoughts. "Another test
Sir?"

"Relax Frank, I'd like to introduce you to Eleanor Arroway."

A womans face. "Ma'am."

"Hello Frank, I've heard a lot about you."

"Frank, Eleanor will be working with us for a while. She, Willie and James, who are also here with her, have some ideas that we want to try." Willie and James nodded and waved sheepishly from behind Ellie. "It will be mostly the same as previous tests. Are you okay with that?"

Frank was relieved. The oblivion he found in the tests was an escape, most certainly, but it was more. He felt personally and unusually compelled to do these tests. He eagerly anticipated them.

He had also always wanted to make the best of what he had. He had been told he had balance; he did gymnastics. He had been told his reflexes were good; he played baseball. He had been told the Marines were recruiting; he signed up. He had been told he had a small team; he did what he could to bring them home. He had been told he was lucky to be alive... He was checking to see if this was true.

The notion that all that he had left was from the neck up at least left him something to work with.

"What's different?" he ventured.

"Well, Ellie's assistant James would like to record the output in order to modify the input." John looked at Frank as if measuring his readiness to know more. He then looked at Ellie, James and Willie. His decision was palpable.

"Ellie could you explain to Frank here please?" He hoped that

Ellie could distil the previous discussions more effectively than he could.

Ellie moved in to look into Frank's eyes.

"Frank, the signal that has been provided to you through your neurochips so far has been a raw stream. The hope was that you could learn to interpret it. So far it hasn't worked. We're now taking a slightly different approach. We have obtained some encryption 'keys' that we believe decrypt the raw stream." Ellie paused. She had more but wanted to be sure that it he was following the story so far.

Frank looked at her, "Ms Arroway, I was trained in military communications, I understand encryption."

Ellie went on. "Frank we believe this signal does not represent a simple replay. It's not just a movie, it's adaptive, something like a computer game. If so, it will adapt to your input. This is why we need to record your brain signals and encode them with the same key."

She paused to let this sink in, Frank didn't flinch so she went on.

"We think by reading your brain signals and keying them we can close the loop. The new signal is fed to a special computer loaded with the original signal. We think it generates a new signal which we then record and feed back to your brain."

Dr Jan Shelley, a neurologist specifically assigned to Frank's case, stood in the background. Frank looked at her for some form of approval.

"I think it will be fine Frank. It should be no worse than what you have had so far, and perhaps better."

Ellie acknowledged Jan and continued. "As to what you might experience. Well," Ellie paused to show a picture on her phone, "here's a picture of my father. I encountered him, or an avatar of him, in the original machine, and, well, I really have no idea what you will encounter. I can say that I don't believe anything you encounter will be malevolent," Ellie paused and smiled, "Say 'Hi' if you see him, okay?"

"Sure."

# **Chapter 9 Fishbowl**

Frank was taken to 'The Fishbowl'. The etymology of its nickname sprung from two sources. The technology was built upon Superconducting Quantum Interference Devices -SQUIDs. The room also required complete isolation from any other electrical or magnetic field. The means to obtain isolation necessitated symmetry, which was obtained through building it as spherical as practical. A plastic grid bisected the sphere and provided a sane platform to work from.

Access to the sphere was through a bridge walkway from the administration and research centre to 'The Fishbowl' building. Frank was able to direct his wheelchair from his residence across the bridge to the centre. Once there he was taken through a stage of preparation which included being moved from his metal wheelchair onto a mobile reclining system of white plastic. This resembled a dentists chair and had substantial padding to ensure a degree of comfort. Even though Frank's quadriplegia blocked any signal of discomfort, the duration of his immersion necessitated a system to ensure he sustained no injury. The white recliner was fitted with an hydraulic massage system that kept him warm and his blood circulating. It also issued intravenous saline and nutrients for the duration of his experience.

Frank was wheeled in and centred in The Fishbowl, adjacent to a small instrumentation pillar. Many intricate coil-like

structures were recessed around the outside walls of the spherical surface. These were controlled by a computer to ensure that no external magnetic field permeated the room. The current in these coils was adjusted in real time to nullify any variations.

Several technicians moved in and carefully connected a scaffolding structure that was assembled around his head. The sensors that were arrayed were then wired up to a metal box that was subsequently inserted into a shielded cavity in the floor.

Finally, long white teflon tubes were unfurled from the scaffolding and connected to bayonet fittings in the pillar. Another tube and mask for administering oxygen and anodyne was fitted to Frank's face, the tube was then slid over an outlet in the pillar.

Words were whispered, a valve somewhere was opened. A hissing sound was heard and the tubes quickly gathered a frosty coating. For a moment snow peels off and drops from the tubes.

Frank had already figured there must be some sort of refrigerant in the tubes. He also knew that the scaffolding held the SQUID devices, and that they needed to be cooled. This was the usual drill. He knew what would happen next. He cleared his mind. He focused on his breathing. The noise would soon deliver him.

A neuron fires.

A small magnetic field results.

A current is induced in a nearby loop. A junction threshold is exceeded and several voltage cycles appear across the loop.

The cycles are counted, a value is encoded. Somewhere

within the cryogenic valley of a simulated genesis the value alters an array of quantum spin states.

This generates a cascade of collapses in the exponentially sized superposition of all states. The range of potential outcomes is reduced. A resultant signal emanates and is fed back to a stimulation device, where another neuron fires.

The spin state of a second entangled electron collapses, and a synapse subsequently fires.

The network of axons orchestrates neurons, meanwhile a matrix of quantum entangled spin states echoes the activity from a series of different universes. Different possible realities converge.

Both systems progressively synchronise to a predestined disentangled state. Reality is made tangible as perception reasserts consciousness.

Sharp waves emanate from the hippocampus.

Memory is committed.

Frank Awakens.

"Wow!" said Frank, as his orientation was asserted.

"What was that song?" he said as the doors opened and the technicians came to unwire him.

Ellie, James, Willie, John and Jan watched the awakening from the monitoring room. They looked at each other.

"Song?" Willie echoed.

Something was very different on this occasion, and it took some convincing before Frank finally accepted that the music

he recalled was a part of the immersion.

The agreed protocol, if any experiment proved successful, was for John Meredith to conduct the interview. After some basic care Frank was taken to the interview room which was fitted to accommodate both interviews and interrogations. Others watched from behind the one way mirror and on monitors. A red light went on above the door which indicated that it was both sealed and that the session was being recorded. Somewhere within the infrastructure the date, time attendees, purpose, witnesses and other metadata were recorded and overlaid on the video. After 10 seconds the text faded and John commenced.

"Interview ID 'DTP263' between General John Meredith and Sergeant Frank Valetti. SETI research in attendance. Interview commencing at 11:06 after immersion experiment concluding at 10:37. I have accompanied Frank since leaving the isolation chamber and declare the integrity of the process and the admissibility of this interview."

The formality dispensed with the General then turned and smiled at Frank, who waited patiently from a wheelchair sipping from a straw to rehydrate himself.

"What happened to you Frank?"

Frank cleared his throat and began, "Well I expected the same jumbled noise, but it was like a dream. More than a dream, more real than even... life."

"How was it like a dream?

"Well my mother was there. She seemed to understand what was happening. But she also knew me in ways that only she could." Frank paused to reconsider his point of entry "We were in the cabin, our cabin in the hills, and..." "Go on."

"I explained how I was in a laboratory and suddenly came to be with her. It felt so real! She said that we had taken another step. I asked her what she meant." Frank paused in a reverie of recollection.

"Sergeant Valetti!" John Meredith asserted gently. He knew that Frank was still a soldier. "This is important, please go on."

"Aye General." He shook away the thought bubbles surrounding him. The words now came, not as the disciplined military report he was struggling to prepare, but tumbling, as raw data avalanched from Frank's mind. "Well, when she said the word 'step' I just did. I couldn't believe it. I was walking. It felt so real! I asked if I was really there. She laughed and asked where else could I be. I asked where I was. She said I knew where I was, and that I knew this cabin. She was right but didn't seem to want to elaborate. I asked how I got there. She said I would find out in time." Frank paused again and then looked into the General's eyes "She spoke to me like I was her son, but also as if we had moved beyond that. She died 3 years ago Sir."

Frank paused. John knew that Frank had much to absorb. He said simply, "Was there anything else important Frank?"

"Well, I asked what we should do next. She said we'd meet again soon. I asked if Ellie's father Ted was there. She said that others would also come, and he may be among them."

John thought of Kitz, the question needed asking, "You have said several times now how it felt real. Did anything specific happen to support the idea that it wasn't just a dream?"

Frank looked at the ceiling for a moment and continued, "If you are asking whether the ideas are mine or planted, then I

have to say that I felt no constraint on my free will, entirely the opposite. I imagine if the experience was just a movie then I could only watch it. I actually interacted, as Dr Arroway suggested." Frank's eyes then widened, "If you are looking for evidence, well I haven't been to the cabin for years, I don't even know if it's still standing. But the detail was amazing."

"Can you provide us with the location of the cabin?"

"Sure can."

General John Meredith concluded the interview. He explained to the others that after such a long immersion in The Fishbowl Frank's carers needed to cater for his health. The General was meticulous in ensuring that his men were guaranteed dignity.

They waited 48 hours before conducting the test once again. In the interim several field staff sought further details from Frank, and determined to compare some of his detail with the physical cabin. The description reconciled, although no-one could be sure if this was due to memory or telepresence. They also deposited a foreign object at the cabin. The incongruous whiteboard had a blue star drawn in its center with the words 'Hello Frank, feel free to leave a mark'. The blue marker was left behind.

+

Frank was prepared for a second test. Feeling like a hermetically sealed hermit, in a room illuminated by carefully isolated lights that cast a sterile medical glow in a white universe, he lay at the epicentre of his own consciousness. Spontaneously he accesses the only musical avenue available to him, he begins to whistle.

The acoustics of the chamber gently resonate the melody. Frank was the performer and audience to the tune of 'When you wish upon a star'. Alone he held the locus of the chamber and indulged in sound. The song calmed him. He wasn't entirely sure why it came to him.

Jan Shelley appeared apprehensive, "Has he started whistling before 18 hours of immersion before?"

The system is replayed again, with no result. This heralded a major roadblock. The ebullience of the previous success evaporated.

A few days later they then try a different combination. They exchange the original signal with the newly acquired signal generated by the quantum computer during the recent successful event. Again it fails to evoke any connection.

The dejection is palpable. For several days they consider what might be happening. Ellie and others of the SETI team have a sense of deja vu; immediately after Ellie's first experience the signal had also stopped, and neither she nor anyone else could go back. Perhaps, as everyone was now beginning to suspect, it was a simple one shot event. They considered whether the SETI institute may have something to offer, but then they hadn't advanced anything for some time.

Ellie harboured her own contemplations. Frank and herself may be unique. Certainly another subject like Frank would be difficult to find. Everyone knew that one of the next logical steps was to put someone else in The Fishbowl. Ellie was also forced to consider whether there was some special disposition she shared with Frank. No one was about to ask Ellie if she wanted to undergo the insertion of a Deep Brain Stimulation device. She anticipated the question and offered that if they found no-one else, and could find a non-intrusive way to provide a DBS equivalent, she would attempt the procedure herself. Frank had commitments to participate in other research activities. There was not going to be another trial for some time. Theories were exchanged but nothing could be certain until Frank was again available to help.

# **Chapter 10 Skies of SKA**

In the end, Ellie said that she could be contacted if required. She decided to fulfil her promise to take a break with Palmer and conclude some unfinished business; so they travelled to the West Australian Pilbara.

Palmer wanted to visit some of the Aboriginal Communities. Since writing his book, 'Losing Faith - The Search for Meaning in The Age of Reason' he felt the need to provide balance. Ellie had teased him and had codenamed his new book 'Finding Faith - The Search for Inspiration in the Age of Enlightenment'. He liked it so much he was using it as a codename. No doubt the editors would want a more controversial title.

He had been researching cases where he could see a unification of humanity.

Ellie wanted to have a look at the SKA and stars. She had to get away from all this 'inner space' for a while.

Having landed in Western Australia International airport they resembled a couple of European backpackers and stood at the taxi rank with their backpacks, a tripod bag and a road case. Their stay in Perth was to be minimal and they had a schedule to get to Jandakot Airport for their chartered Cessna 172. Palmer had obtained his license and pictured himself as a hybrid spiritual anthropologist. He wanted to invert the notion of missionary and attempt to delve out similarities in spiritual foundations; to learn, not teach; to be changed rather than bring change. They had to detour past a supermarket where they gathered supplies. With several cooler bags loaded with various perishables stowed away in the back of the plane, they were relieved to be finally under way. Palmer taxied; performed all of the intricate manoeuvres; concluded the Air traffic control dialogue, and set up navigation. Once they were safely in the air and on course Palmer visibly relaxed and spoke.

"Did I tell you that I had to fly a pregnant woman to Broome once?"

"No, how did that pan out?"

"Well she decided that need for the flight meant that her child, a girl, was meant to be a part of Brolga Dreaming. She's since become a nurse for the Royal Flying Doctor Service. Did you know; rumour has it that Brolga's can carry their young in flight?"

Palmer stops talking for a full minute. He adjusts the trim and altitude to take advantage of a tail wind. He continued his story.

"Well they are storks I suppose. She's now been midwife to five babies. They're also a part of Brolga dreaming. Two girls! and she's 'mother' to them all of course."

Palmer glanced across at Ellie and continued: "She keeps in touch and recently emailed me saying: 'maybe they'll grow up to be nurses too'."

"So this is good isn't it? More nurses in the outback?" Ellie quizzed.

"Well yes, except the women are now all holding off and contriving ways to make sure they give birth in the aircraft!"

Palmer laughed. Ellie puffed out her cheeks and went cross

eyed in imitation. They both laughed and Ellie related a few stories of mischief during the long nights of observation. Suddenly, Ellie laughed out loud.

"Do you know there was one time when Willie had to do some maintenance on one of the parametric amplifiers. He had dismantled it and went to get a cup of coffee. I put an extra screw in his dish. He disassembled it twice before we let him off the hook."

Palmer laughed. "I'm in a plane with the devil incarnate," he paused as if recalling something. "Was it you that added AC-DC to my 'good night sleep' playlist?"

They both laughed.

"Sorry, said Ellie. It was soo.. saccharine. I couldn't stand it!"

"Actually I'm a fan now."

The flight continued. The landscape changed...

Again Palmer's voice crackled through the aircraft intercom. "You said we had to maintain radio silence around the SKA, that's actually not an issue. The normal protocol is to just 'knock on the door'."

"Huh?" quizzes Ellie.

"Watch," offered Palmer as he descended to the township.

Palmer did two circuits of the town. Towards the end of the second circuit a Land Cruiser started up and created a trail of dust as it drove out towards the airfield. Palmer banked over to land. On the ground, as he taxied to the parking area, the Land Cruiser pulled up.

"How much gear do you have?" called the Superintendent, a

man called Macka.

"I'll take this case thanks Macka, but there's those 2 bags, that guitar case, the cooler bags and this long case here," supplied Ellie.

They're taken to a corrugated iron house. The construction is new. A porch surrounds the homestead and provided relief from the searing, dessicating heat. Several old and mismatched, but comfortable looking, furniture pieces are arrayed around the porch. Flyscreens cover all the windows, which are slats and hinged open. Air flows through the house and brought the dust in to settle.

"Did the Avgas fuel drop happen Macka?" asked Palmer as they settled in.

"Nope, the Fuel Carter 's missus ran off, and he went after her."

Palmer stopped his unpacking and looked up. Macka continued.

"I heard he's got her back though. He had to promise her a shopping trip in Perth. It'll be here next week."

Palmer looked at Ellie. "I could do a flight down to Mt Magnet to get some fuel."

"Let's relax a bit first, unless you have to be somewhere."

From this response Palmer assumed Ellie was not in a rush to move on just yet. There was no telling how long it would be before her projects would need attention. The weather patterns looked stable, the charter fees were loosely related to the aircraft flight hours. The Cessna could stay parked a while. He would now be able to make the best of the available time.

Palmer had a vague plan. He knew that someone he had studied with at the seminary was now working at one of the remote Catholic bush schools. He had been given an invitation to drop in, and the locals apparently knew some special places that the tourists didn't.

First Ellie would want to set up the contents of the road case and tripod.

He walked into the kitchen and peered out the window to find her setting up her telescope as the last rays of the day began to redden the sky.

Palmer and Macka opened a few cans of beans and got the grated cheese and bread out of the freezer. Palmer pulled out the mushrooms they had acquired earlier that day. They wouldn't last in the heat so he put them in the fridge. They both wistfully commented on how a cold beer would be superb with the baked beans, if only it wasn't a dry zone.

Macka asked about the mushrooms. He said they were very important.

"Why is that?" Asked Palmer.

"Well it is a dry zone, although we are allowed to cook using whatever ingredients are required."

"Yes..." Palmer didn't yet know where this was going.

"Well I have a recipe for mushrooms and white wine cream sauce that requires a particular ingredient that I have in reserve. Just for a special occasion like this," Macka smiled a mischievous smile. "Of course we only require a small amount of the wine for the mushrooms." "Seems a bit of a waste. I suppose we could simply let the extra wine turn to vinegar," mused Palmer.

Just then Ellie walked in smiling beatifically. "I believe we are obliged to periodically test the quality of the vinegar."

The next day Ellie and Macka headed out to look at some of the arrays. Macka insisted that he needed some photos for the publicity engine. Palmer again laughed at her antics as she did a number of 'Vogue' poses. They did some brief work checking signal to noise ratios, and looked at the data quality.

When they returned they encountered a man with a bushy black beard and a mass of long curly black hair. A pair of smiling eyes peered out from under eyebrows that were indistinguishable from the massive head of hair. Palmer introduced his friend Jacques from his seminary days. It was then that the guitar revealed its purpose. Palmer presented this to Jacques, and that night Jacques played some of his repertoire. This included Daddy Cool, AC/DC, The Eagles, Pink Floyd and Neil Young. They scoured the internet for lyrics and gathered around the computer monitor to sing from them. No-one for 200km was there to hear. Perhaps it was just as well.

The next day they met up with an Aboriginal Elder to visit a remote waterhole. They were glad of the guide since there was no way they could find their return path, let alone the waterhole. After several hours of lounging, and watching children chase Goanna meat, Palmer swam over to a waterfall. The red rock was gently sloped so the cascade bore a closer resemblance to a series of interconnected pools. As each pool was sampled Palmer came to realise that the higher pools were warmed progressively less by the sun. In the Pilbara heat he was enticed upwards by the greater appeal of the higher pools.

As Palmer moved over the crest he found that the next pool was undisturbed and as limpid as glass. He hesitated as he contemplated the barrier between the air and water. In the end he could no longer resist, and he carefully lowered himself into the pool. The cool water inexorably engulfed him until all but his head was submerged. He reached to the bottom and touched the felt of the green growth of the water plants. He walked his hands upstream until he had to clamber over another gentle inflow that had its ingres softened by surrounding plants.

The next was even more glorious. He submerged and this time swam gently up the stream. He was careful not to disturb the clarity of the water. He hyperventilated, took a deep breath, and swam down. In a deeper part of the pool he pinched his nose and rotated around to look up.

Through the water and with the blurred optics of his terran eyes he could see the sky; a tree; a rock wall on the right, and what appeared to be a finger of rock to the left with a figure standing upon it.

His lungs reminded him to breath. When he surfaced he saw that Ellie had materialised there. He caught his breath. She stood with one hand on her hip, and holding her bathers aloft in her other hand. She dropped them on the rock and threw herself into the water with an almighty bomb dive.

He soon joined her native state and they showed each other all the stupid dives they knew as children.

Before long he held her in an embrace. He quizzed:

"So evidently I wasn't stealthy enough to escape?"

"Well I had no idea where you had gone until I saw a whole barrage of water come over the top of the falls. It could only have been you. Jacques winked and pointed me to a shortcut."

"This has been easier than I thought," smiled Palmer.

"Palmer Joss, I'm not that kind of girl," she splashed him.

"No I mean getting you away from the new project. You haven't said much about it."

"Well it's kind of ... embryonic. There's not a lot I can say because it's only a spark." She paused. There were lots of ways this conversation could go. "Shall I see if I can get you instated as the moral compass for the team?"

"No I'd like you to guide me. You have come a different way to get your spiritual balance. Almost diametrically opposite to mine. I want you to enlighten me."

+

They stole time to roam between several of the remote communities. Ellie helped by blending the spare parts from various computer labs into workable units. At night they would talk of the stars to some of the Elders. She took notes of the local names for the constellations and the stories that surrounded them.

Some weeks later, on the return to Macka's place, they sang to the music of the car CD. The dusty outback rose in a cloud behind them, it diminished as another cloud of dust appeared before them. The two vehicles negotiated their greeting with reciprocated headlight flashes.

Taking care for their precious windscreens, the one hundred octillion atoms constituting a subworld of melody, laughter and four sentient lives waved congenially, as another one hundred octillion atoms in a subworld of country music and VHF transmission nodded back. The two worlds continued along their way, their dust clouds mingled and settled gently in brownian motion towards the 10 quindecillion atoms that anchored the objects, and provided the meagre cloud chamber substrate that supported this ineffable near miss event of classical atom colliders.

Once they had returned, settled and rinsed off the dust, Ellie walked into the spare room. She drew back the sheet she had draped over the telescope and carried it out to its place in the yard. The legs of the tripod were positioned on the markers; bricks with indentations she had half embedded in the dirt.

She made some minor adjustments and then pulled out her log book. Not so much because she expected findings of any scientific value, but because it connected her. As she made her date entry she realised that they had spent four weeks in the outback and she had not felt inclined to check her email, nor had she had mobile reception or messages. Palmer had truly isolated her. She wondered if he had done this deliberately.

Now, with the wet season approaching, heralding her return to civilisation she felt she should reconnect. She had a few more nights and the time difference would mean she could wait another day. A small group of Aborigines had come to know her, and held the telescope in high regard. They loved to be shown the rings of Saturn and Jupiter and the Orion Nebula, the Horsehead Nebula was their limit though, it was a jittery blur.

And here in the middle of nowhere in a desert with no light pollution and clear arid skies she could see the Nebulas, the moons, the rings and the hints of distant objects that the Hubble telescope had placed in glorious detail on the internet. For Ellie this was the second time she had the good fortune to be in the right place at the right time.

On this night Betelgeuse uttered its last gasp.

A magnificent gasp.

Ellie connected her camera to the telescope. Many others would already know. She could indulge, but tomorrow would be a big day.

## **Chapter 11 Doors**

Frank was not disturbed. He had never felt so much at peace. He had found that he was indeed lucky to be alive.

Frank knew that the invasive nature of his Deep Brain Stimulation device was highly risky. He was on all manner of immunosuppressant and other equally unpronounceable drugs. A brain aneurysm was hovering over his future like some sword of Damocles. It hovered over his electric DBS directed four wheeled throne, and it unceasingly threatened to plunge through his crown.

He knew now that the world with that sword was one of an infinite variation of worlds. He felt in his heart that there was another world, another universe, where the sword never had its genesis. He suspected now that that world was within reach, unless the sword fell first.

He also knew that the people pressing the buttons really knew what they were doing. He was listening intently to a conversation between them. There had been a lull in the experiments as the team dispersed to allow each researcher to follow a their own different line of enquiry. They had reconvened to share any findings.

"So why doesn't it work any more?" asked John.

"Well," ventured James, "there are probably thousands of combinations that won't work and potentially only one that will. I wanted to let you know I had another look at the newly recorded output signal, from the immersion that worked."

Willie countered, "Why? isn't it just a mash of Frank's signal and the original signal. Hang on, are you suggesting that because it went through twice we need to decode it again?"

"No, I don't think so," said James not really wanting to be interrupted. He had begun to speak in his 'teacher's tone'. This was an odd hybrid mimicry of the various teachers, lecturers and tutorial mentors he had encountered. It was usually associated with a patronising monologue but also a breakthrough he wanted to share. He continued, "in actual fact it is simpler. What we're doing here is encoding thoughts with a key and throwing it into Q-Space. It looks like there's something in Q-Space doing the same, but in reverse; they get a signal, they encode their signal and throw it back." James glanced at his audience and Willie rolled his fingers, a signal to move on before he lost his audience. James closed his eyes and made a conscious effort to move his train of thought to different rails, "anyway I went back to my previous analysis technique. I wanted to see if the keys were the same as the last time."

Willie was no slouch. He was onto James' idea immediately. "Let me guess. The signal has the same structure, but different keys."

James nodded.

Willie stood up, he was now excited and words were tumbling out of his mouth. "Of course! This means the signal is more like a self writing polymorphic code."

It was now Willie's turn to get blank stares. He could see that

no-one had quite seen the connection. He backed off a little.

"I, errm, read it recently in a magazine. It's like some of the modern computer viruses or worms. In order to avoid detection it self-mutates every time it is executed. This means that we were on the right path but with the wrong keys."

They discussed how to use the new keys and signal. A whiteboard was used to try to formulate a model. The group gathered around the whiteboard and drew boxes, arrows, text and symbols as Jan filled in details of the functional blocks of the brain, and James filled in the key extraction process. Many of the boxes began to resemble matryoshka dolls, having been encapsulated in boxes within other boxes. The lines then took on different colours distinguishing chronological against information or neurological flow. In the end they seemed satisfied and the final art was photographed before being printed.

John Meredith wasn't sure if all of this was really helping his original agenda. He wanted to direct efforts to telepathic and prosthetic controls. Now his best subject was wrapped up in this new direction, and he wasn't sure if the research would venture down Telepresence, or some whole new universe.

What he had began to grasp was that there were bigger questions that were getting answered. It felt a little like the bigger steps in the early days of his project. Those steps had since become conservative, and the results incremental. He was now again ascending to the giddy heights of pure research. It seemed to him that the bold research agenda this new team were striking for could make bigger advances.

It didn't change his disquiet or the tendency to hover his foot over the brakes.

"Hang on a minute," he said. "Let me get my head around

this. You're saying that this whole thing is like the story of the email, and grandma's cat from months ago?"

"Exactly. Except once a particular key has been used it can't be used again."

James ran with the idea. "It's like we used a password and read the email that said 'the cat was dead and here's the new password'. Nothing could alter the fact that the cat was dead, you can't go back. Now the next email tells grandma about the kittens, it has a new reality to start from. This new reality has new variables and in this case needs a new password. This is actually kind of a quantum mechanical wave collapse." James' mind was also racing ahead and his explanations were now mashing with his thoughts.

John was exasperated. "But how do you give grandma her new passwords?"

Willie again stepped in. "Well right now we need a quantum computer to work them out. We don't know how they're made. For all we know they might be ticks of the clock."

He paused and held up his hand while his epiphany matured. "You know a better explanation is a room with many doors and a bunch of keys. You take a key and open the door. Inside the next room you see another bunch of keys. You leave the keys behind and go to the next room. More doors more keys. But none of the keys open the door you came in.

John could appreciate this. The quantum computer was also a new resource. He previously had no access to such a thing. "Okay, so walk me through this process. We use these new keys for Frank with the new signal. We get another signal, and we work out yet another set of keys that we can use. And you're saying this can just keep going and going?"

They finally conclude that if this theory is correct the system

might represent a progression of conscious states through time. Each time the immersion is conducted the stage is set for the next.

The theory gets put to the test. The new keys are loaded with the successful signal. Frank is immersed and returns from the experiment smiling. With Frank's validation that they indeed have the process worked out correctly they decide to contact Ellie to get her to return.

Frank is also debriefed again. John takes his clipboard into the debriefing room and Frank spontaneously starts talking about it.

"It was different," he states.

"How so?"

"Well the last time the answers were a bit vague. Almost as if they weren't fully thought out."

"Go on."

"Well this time she seemed to have had more time to think about it."

A bell chimed. This signified an interruption. John was put out, he disliked interruptions but knew it was likely to be important. He excused himself and went to address the interruption. It was Jan.

"Sorry John, I wanted to let you know that we need to be careful here."

"Why?"

"Well I'm aware that you've defended Frank's right to participate in the discussions and theories but it may have compromised his objectivity. He may be trying to fulfil a set of expectations as a result of the last discussions."

"Noted," he said. "Any suggestions?"

"Well I think you could ask that he consider alternative explanations. Frank's smart, he'll see through any mind-games. Let him try to convince us."

Frank provided further explanations into the universe on the other side. He had been given some questions that might help resolve some of the philosophical paradoxes.

John referred to his list. "Did you ask her to provide some information that you could carry back as we discussed?"

"She seemed to anticipate me," replied Frank.

"How so?"

"Well she asked if I had a theory that she may just be a part of my own subconscious."

"And..."

"Well I said 'yes' and I asked 'how could I be sure?'" Frank paused, "she asked if it felt real. She asked if I knew the answers to her questions before she provided them."

"And did you?"

"No, I think that was what really convinced me. Sure there were some questions that I kind of knew what she'd say. But not all of them. I didn't feel ..."

There was a pause while John waited, "Yes.."

"... Connected," Frank looked illuminated. "That's it. It was a feeling that I had absolutely no idea what was going to happen next. Not like in dreams where a thought occurs at

the same time as it sort of happens."

John referred back to his notes. "Was there anything that would validate her as a separate consciousness?"

"Well I straight out asked her if she was real. She asked if my dreams were real. I said they sometimes felt real until they went weird.

Sir, there was a feeling I had while I was there that I could only honestly say that I have felt when I was truly aware. It was like there was a whole layer of reality lying beyond. A bit like I was crippled and I could learn to walk but more like I am blind and that I could learn to see."

The conversation continued casually as if they were discussing a friend met recently at the park. Simple stories, exploring the edges of boundaries that neither knew how to explore and could not be easily articulated.

+

They eventually conducted another test. Their aim was to obtain as many sets of keys as possible. From a larger sample set they could then begin to look for patterns.

As the final moments of the signal transpired Frank's vital signs collapsed. The medical team tried unsuccessfully to revive him. He was pronounced dead forty seven minutes after the test concluded.

## **Chapter 12 Cycles**

There is an autopsy, a funeral and a wake.

Ellie had meanwhile returned with Palmer and was reunited with the research team at the wake held at the military academy adjoining the laboratory. They paid their respects amongst the military and family. As the group encountered each other they conspired to slip quietly away and regather back at the lab. Because of its sensitivity Kitz had deliberately excluded The Fishbowl from the wake proceedings. The team however needed to reconnect, remember and consider their next step.

At the behest of John and Ellie the group dragged a couch and some deck chairs into The Fishbowl and irreverently brought in beer and pizza. Although Frank was not present there was an empathy with the place he elected to be and his italian heritage.

Discussion turned to his quadriplegia. Was he at peace now? Would they have found that final neural connection? Should the research effort have been directed there instead?

John Meredith stood.

"Attention please," his voice slurred slightly. "I would like to toast one of the bravest men I ever knew".

Murmur.

"Let me tell you scientists, and clergymen," gesturing Palmer Joss, "about a combatant. Frank fought. He fought for country. He fought for life. He fought for hope."

The others looked at the General standing there. All knew that he was semi retired and had no experience in research, but he knew the spirit of people, perhaps more than any. He went on.

"Frank knew it would end one day. In his heart he knew it would be before his time. It left just one more battle. In the end Frank fought for peace. To peace," he concluded and raised his glass.

They all celebrated him. John then surprised everyone. He

reached into his tunic and withdrew a recorder carved from a dark rich wood. With aplomb he played a long single note.

"Nice", he said and played the same note which then rose into a recitation of 'When You Wish Upon a Star'. As the last reverberations dissipated John sat. "That tune, for you youngsters, was around almost before my time. It came from the 1940's and it is strangely appropriate for Frank to have mysteriously rediscovered it. He returned from an active duty that I authorised, and he has been searching for a peace and a desire to again become the real boy he once was. If he is Pinocchio, I am his Gepetto. I am proud to have known him."

He sat, leaned back, put his hands behind his head and asked, "What now troops?" The others felt a sense that things could now move on.

"Another subject?" Suggested James.

John Meredith stepped in. "Frank was quite unique. It took over a year before he could use the DBS to even manage his pain."

Jan Shelley offered. "We don't know whether our success came from sheer brain plasticity. Frank's determination was also extraordinary. For all we know we may not have a candidate like him."

Ellie returned from a reverie. "We also have a number of paradoxical questions. For instance, we think that the same moment can't be experienced twice - no rewinding. We actually need to expand that question. We don't know if the same moment can be experienced by two different people. Can I for instance use the same first moment? Second? or do I need to use Frank's last moment"?

"And if you use Frank's last moment," stepped in Willie, "does

it also become your last moment?"

The room fell into a hush.

They agreed that in order to move forwards they needed to break free of the deep brain stimulation device. They discussed Nanotechnology, Viral technology, focusing electromagnetic waves and MRI. There was no clear avenue forwards.

As Senior Neurologist Jan Shelley succinctly explained that Frank had been the recipient of the most advanced technology science had to offer. If there was an alternative to a Deep Brain Stimulation device it would have been used. The argument moved on to whether Frank's need of a long term solution to quadriplegia differed from the system needed now.

The discussion went around in circles again with the focus on nanofibres and cochlear implants before Ellie asserted her authority.

"Please, please guys. Lets start afresh. What do we know?"

Willie tried to get his head around it. "Okay I'll recap. I could have an experience in this real universe. I could then immerse myself into this other Quantum Computer 'thing' and have an eighteen hour experience in that universe. But then I effectively 'save the game' and come back into this universe!"

James stepped in, "that's pretty much it. The difference is that you can't simply 'Revert to a previous saved game' since that moment has happened."

Willie expanded, "So my 'life' in this... What in blazes do we call it? 'Quniverse'?... has a series of eighteen hour snapshots, and each one can be punctuated by a whole heap of deliberation and contemplation about what to do next

before I go back into the Quniverse. Except I can't do it, unless I apply a can opener to my brain."

Ellies' expression changed. "Well yes. What's more is that maybe Frank has a saved game. He may not be able to deliberate and contemplate in this world any more, as you put it. But something might now continue on, if we keep the wheels turning."

Silence prevailed, no counter argument seemed to present itself. "Well I suppose if it doesn't work we should see a flat line." Concluded Willie.

This train of thought proved far more sobering than they had been prepared for. Suddenly the group in The Fishbowl stood. The plan became formulated and the first steps of execution taken.

James worked feverishly to take his key analysis routine and shorten the cycle. A large part of the work was the key extraction and preparation of the signal for subsequent analysis.

While Willie and James continued to manually assure a supply of keys and signals to the cycle John brought on some of his software development team. Ellie assigned them to automate the process based on James' preparatory work.

They worked as if Frank's life depended upon it.

+

After several months of cycles John called a meeting to discuss progress.

Willie kicked in with his contribution first. "Well we have the process down to a pretty good period. We have an eighteen hour replay and a six hour turnaround. It means we can turn

a cycle every day."

James was uncomfortable. Ellie picked up on this and asked for his contribution.

"Well it appears as if the signal itself is getting longer."

Eyes turned to him.

"I can't be sure what this means but I have my suspicions. I think we are retaining too much history. This is creating a runaway of alternative options and more keys."

"You mean Frank doesn't forget anything?" asked John.

"Well in a crude way, perhaps yes. I think there is a way to truncate the history but I can't be sure which keys hold the less useful history. If I go too hard it could be like a lobotomy. If I go too soft the cognitive process could bog down to a snails pace."

Ellie drew in Jan. Since this was looking like some form of brain surgery, she thought it needed the input of a brain surgeon. "Jan can you have a look and give some insight to James on this?"

"Well, this is more like philosophy than neurology but I'll try."

Having dispersed, James and Jan then withdrew to the analysis area dedicated to the quantum computer signal output. Some time later they determined that some of the extra keys actually repeated. Jan expressed a deep desire not to cut anything back until absolutely necessary.

"I know Frank," she stated, "he was, is, oh crap, he IS a fighter. If doing this was his choice, then he would probably have done so with the intent of trying to help."

"But how could he help? He's dead Jan!" James' lack of

sensitivity was something Jan was accustomed to. She had studied Aspergers, and knew the symptoms; it still bothered her.

"Maybe not! rather than cutting off what you call history he could be trying to communicate back out. Maybe there's a sign or something that's hidden to us."

"What did you say?"

"I was just saying that we may not be cutting off just history."

"But you also said something about signs." James went silent for a minute and set up a replay of the data in a time lapse loop. Eventually he whispered, "these constant and repeating signals don't kick in until well after we started our cycles after Frank died. He then called Willie into the room and explained his thoughts.

"Willie, if you were somehow digitized and recorded on a video and audio track, and you knew that someone was particularly interested in the signal, how would you attempt to send something out?"

Willie's face went bright red. "I'd create some easily accessible and consistent channels. I'd create master keys and I'd lay down a few video and audio tracks."

"Let's get Ellie."

Ellie, accompanied by John, patiently listened. She suggested James and Willie look for an audio and video output signal. The hope was that such a signal would also provide the clues on how to send any acknowledgement to Frank.

She said, "If we have to put signals in blind it may take ages, we need a clear acknowledgement. Also, if we don't get it right on the first attempt we might begin double guessing ourselves. We need to find out which is which, and we need to exercise caution now."

Willie and James were no longer looking for needles in haystacks. They had seventy-three cycles to analyse, the repeating signals reduced the candidate channels from seven thousand down to eight. No-one wanted to leave while the signal specialists were there doing their thing. If James and Willie could go without sleep so could they.

Soon enough they found an area where the signal could not be simple noise. The binary values yielded a pattern which appeared to show a slowly modulating series; a short and very inefficient audio track. When played it was Frank whistling "When You Wish Upon a Star".

Maybe we should simply have Shazzam'ed it suggested Jan.

Willie slapped his forehead and linked in his library of spectrograms for the second time with extracts from the repeating keys.

Willie had originally applied this technique during the analysis of the first Contact signal. Many resources, including his had been bent towards the search for the primer. While it was Hadden Industries that had ultimately cracked the code Willie's spectrogram library had been used extensively, but unsuccessfully at the time, to search for further patterns.

It now yielded a connection to the previous algebraic notation of vectors, tensors, and linear algebra.

"This isn't video folks," uttered Willie, "that's Virtual Reality, right there!"

John said simply. "I need to make a phone call."

Ellie had the feeling that it wouldn't be long before Kitz would

be back on the scene.

### **Chapter 13 Doubt**

The road shimmered as the Dodge Durango crossed into South Carolina on Route 95, and the Savanna River soon passed behind. The rental agreement signed by Dr Peter Ellery was picked up from the passenger seat by the driver who then crumpled it into his pocket. He did not want it to be tossed out with the rest of the fast food garbage since it may need to be produced when he arrived in Florida. For everything to slide beneath the radar it had to be kept as routine as possible.

He slipped another CD into the car stereo and pressed play. Instead of music a robotic voice played over the player.

"Holonomic brain theory <pause> From Wikipedia, the free encyclopedia. <pause> The holonomic brain theory, originated by psychologist Karl Pribram and initially developed in collaboration with physicist David Bohm, is a model for human cognition that posits cognitive function as being guided by a matrix of neurological wave interference patterns situated temporally between holographic Gestalt perception and discrete, affective, quantum vectors derived from reward anticipation potentials..."

The voice droned on for five minutes before the driver pressed the previous track button to replay it. This time pausing it occasionally to regurgitate the sentence. Evgeny Illarion had a good memory for lines. Through audition calls and his agent he had some minor success with acting but he was impatient for success and hated working under direction. To make ends meet he waitered and could sometimes draw a crowd by garish impersonations and accents. He recognised that he could ad-lib extremely well and found some like minded folk. Together they opened a theatre restaurant where they would portray celebrities.

On one occasion, purely by chance, he pulled the right character. His Russian descent helped a little, he could sound precisely like his father who owned a fruit shop in New York. He did his best Russian Mafia Viggo Mortenson impersonation and approached what appeared to be a fairly distinguished table. He was accustomed to some of the audience being 'players' but this particular table was doing far too well. Before he stepped in too deeply he let them know that he was a part of the show. The old gentleman at the end laughed, and told him to turn up for a real job the next day.

A thrill coursed through Evgeny's nerves, he had finally aligned with a league that could effectively call on his skills, he loved his job. He was an agent; not a 007 super guy, and not for MI5, the CIA, Defence, Police or even government. The organisation that employed him needed to deflect certain National Security Agency investigations. His misdirection had been executed perfectly and as a result his expense account became significant and his loyalty absolute. His face had changed significantly over time following his undercover work to avoid possible recriminations. He had no ego, he was the chameleon, and Hadden Industries used his services for some of its most sensitive operations.

His role required heavy research and preparation, and Dr Peter Ellery had to be a convincing academic. Evgeny could have taken the plane, but he needed time. He drove to allow him to draw upon his study of the Stanislavski method. This needed substantial immersion, the type of dedication to study required of a 'Holonomic Brain Theorist'. It was also a nice way to see the countryside while he studied.

+

The email was simple.

Wu Hsu,

Your suspicions are proving correct. Kien Mu is showing that the new system seems to be coming online.

I will make the call you requested with the phone recently acquired.

Expect that soon you will be able to pass on our congratulations.

Good luck.

Xien Wu Hsu was pleased. It showed that the existence of the system was further validated. It also indicated that 'AngloAkira', who had helped so much in the uncovering of the developments, now had a phone with a newly downloaded trojan application. This application could be used to couple with the onboard GPS to act as a homing device. He would soon be able to track AngloAkira and make his advances.

He made plans. Wu Hsu prepared by first clearing his mind. He rehearsed the first stage, walked his mind through to the point at which he last played a move, considered the scene and played a different move. In this way he hoped to rehearse for whatever unexpected outcome presented itself. he had studied ancient chinese Many years ago the revered Chinese bladesmithing and Jian, which descended through its lineage to be the core of the Japanese Katana.

The sword soon to be wielded was inconceivably more powerful, but also built in forges of thought. So it was that through his dedication and discipline he considered himself worthy of being the person to bear the Jian of Wénshū, the 'Sword of Wisdom', to its new home. But to be worthy he must understand its womb of conception; the forge of thought. The focus of his meditation was thus the materials, the furnace, the anvil, and the folding of the paths of the future. Soon the sword will be quenched. Then it can be wielded.

+

Before Ellie heard anything from Kitz she received a strange message that reminded her poignantly of the times she had been in contact with Hadden. This was far more subtle however. A small mp3 player and headphones had been placed in a purse in her handbag. She didn't see who had left it there.

She took it home and stared at it on the kitchen bench a full minute before donning the earbuds. She pressed the play button. A male voice...

"Ellie, you probably don't remember me. I am Gaven Shorten, I am the Assistant to the CEO of Hadden Industries. I met you briefly when you were first seeking funding, and I was skeptical of your ideas. I have since learnt to understand the way the wheels of the world turn, and I hope you can forgive me."

Ellie pressed pause on the player. She recalled the man at the round table in the penthouse at Hadden Industries headquarters to her mind's eye. His contrition was almost evident even then, probably from fear of SR Hadden. She forgave him and pressed play.

"While I have learnt to trust the wishes of Hadden I must know that the proper precautions are in place.

Firstly, I must ask that you destroy this after you have heard
its contents. Do so by pressing pause for ten seconds. You will hear a beep, there will be no turning back.

Secondly, I must ask that you keep the source of the information I am about to divulge confidential. If you are not prepared to do this then I ask that you stop now and destroy this with the ten second pause and a confirmation beep.

Thirdly, this message will require authentication. Please recite the phrase "look at the big picture". Press 'play' when you are ready."

The recording stopped. Ellie sat contemplating her options. She hated secrets. They were so circular. How could she know if she wanted to know, unless she knew? She had to be perfectly honest with herself though. Hadden had not yet let her down. Now, beyond the grave he still played the paternal figure. Ellie did not believe in ghosts, she did believe that any posthumous instructions would be in her best interests to consider. She recalled Hadden's last words: 'Wanna take a ride?' the ride wasn't over yet it seemed.

She pressed 'play' and said "look at the big picture".

There was a short pause as the small CPU worked to validate the voice. Soon enough the voice returned.

"Ellie, as you would be aware Hadden Industries provide the benefits of our innovation to any organisation having sufficient funds. Although this may at times seem mercenary it is also an important role since our non-partisan approach ensures both the balance of power, and the interests of the corporation.

Hadden's success in the defense industry comes through its agnostic and political impartiality and a deeply instilled sense of morality. We are frequently criticised for our presumption, but with power comes an acceptance of great responsibility and its most diligent execution. So it is that we have provided our machine learning systems to the defence and intelligence organisations of all the major powers.

It is also in the interests of Hadden Industries to maintain peace. Although war can be equally profitable it introduces variables that are hard to model. In this pursuit we are able to obtain highly important strategic information on the state of peace through the machine learning systems which we are obliged to maintain.

In short we have a set of 'back doors' which we use at our discretion to extract and provide advice. When there is a threat to peace on any side we identify someone that can help restore the balance. We think you would appreciate such a process, unlike the various governments. This I hope explains the need for secrecy.

SR Hadden himself placed you on the watch list to be advised on any matters to do with the SETI signal. This demonstrates no small degree of trust and this recording is the result.

Our findings then.

The Chinese have a machine learning system they call Kien-Mu (a tree linking heaven and earth). This system has detected a strong connection between the original Contact event; a quantum mechanical computer; the death of a Mr Valetti; social network noise from an online avatar by the name of 'AngloAkira', and the movie 'Brainstorm'. We are unsure of what this really means. We have independently determined that this connection has been acquired through a number of tweets from AngloAkira and that this has been strongly connected to James Frazer, General John Meredith and yourself.

This alone would not be of significance except for the fact

that the Triad Chinese crime syndicate has penetrated the Chinese machine learning centre and has a strongly focused interest in the matter. What we know of the Triad is a 'Xien Wu Hsu 4-1-5', who is well placed in the Chinese government. This contact has been wanting Hadden Industries to connect a machine learning system to the Stock Market in order to maximise the return on stock market speculation.

This is something we believe may have a destabilising effect. The technology for High Frequency Trading is still raw and volatile, and its predictive power is inadequate for long term trading.

Ellie these are the facts, our practice is not to place interpretation upon them. Please take steps to mitigate any possible threat to your project team members through this Triad agent. It is also known that the same connection has been subsequently made by your government.

Please destroy this recording at your earliest opportunity by using the pause button for ten seconds and do not feel obligated to act as a result of this information. Use it with caution if you choose to.

Faithfully Yours, Gaven."

Ellie committed the name Xien Wu Hsu and AngloAkira to memory and pressed the pause button. The next time she pressed play she heard Abba music.

She felt a surge of anger. She was not some agent in a game of espionage and she wasn't sure what her next actions should be.

+

Slumped back into her couch, she felt drained. The successes and progress of the last year were undeniable. The roller

coaster of her SETI research had taken her to soaring heights. So why did she feel lost?

Was it Hadden's news? Was it that she wasn't sure what to do with the new signal development? Was it that nothing could be done till after Kitz had deliberated? It was the sheer confluence of events: The Astronomy world had gone abuzz with the Betelgeuse supernova. A dead man was encased in a quantum computer. Her nemesis was about to step into her life again. It was meant to be simple.

She thought about Pensacola, and skipped through her playlists before settling on 'Dads Faves'. A microcontroller drew bits and bytes through a bus and pushed the data into a codec that decompressed and translated it all into an analog signal. This was pushed through a series of interfaces and amplification stages before magnetically coupling coils attached to cones. In the end the simulated acoustics of a six string guitar and the song 'Helpless' emerged. Her mind wandered to Ontario and inexorably south to Wisconsin.

"All of my changes were there," she said aloud to no-one in particular and resolved to go home to De Pere. She needed to clear her head. There was no doubt in her mind that Kitz, Rachel and other bureaucratic climbers would be briefed, and funding would be found. A new snowball would gather momentum, and the findings would be suppressed until they had been sanitized and defanged, or maybe fanged and fitted to some military purpose. She was 'in' too deep now to be shut out, she could afford the time to breathe. She needed it.

At the same time at a personal level she just felt like she knew too much. The motive of the original SETI programme was to look into the unknown. That original naivete was gone, and it was always that ideal which drove her. Now she was looking at a completely foreign set of implications. It was almost like expecting a telescope for Christmas, but finding a microscope in the box.

Was the universe sending her some subliminal message? No, that was a shaky path that she wanted no part of. She resolved that if that was the way the universe operated then Luke Skywalker should materialise lounging on her couch before she could pour her Earl Grey tea.

With her tea in her cup in her lounge room, and without Luke Skywalker's miraculous appearance she sought the next alternative. She resolved to call Palmer. After he had returned from his new age missionary work he had began teasing out his notes for his new book. For the next four days her childhood home in De Pere would be perfect for them both. Anything else would have to wait for her return.

+

There was something strangely symbolic about the way the aircraft descended; inexorably submerged itself and, after a brief period of disorientation, dropped below the softly frothing barrier. Once on the ground there was a light drizzle interspersed with occasional periods of virge. As they drove their rental from Austin Straubel International Airport the windscreen wipers were periodically parked and sent into active duty, the intermittent setting being all but useless.

The Autumnal leaves of Wisconsin did more to cloud Ellie's mood than the deep nimbus overhead. The conversation was cordial and practical during the drive, all of the carefree singing spent, and as incongruous as the blue sky. As they walked through the front door Ellie could not help but look at the place her father had died. Palmer picked up on it, and asked about her thoughts.

"You know," she began as she leaned her head against the door jamb, "for me it was always about space. I really had no

idea 'time' would take centre stage."

Palmer considered his response. He could guess that this was about her father, but also about what was happening with the new SETI developments. In the end he kept his silence.

"He died just there," she said.

"I always figured if I'd put some medicine downstairs, he may have lived." Ellie looked at Palmer. "I blamed myself. Completely irrational, huh?"

Ellie walked over to the staircase. She sat and put her head in her hands, swept back her hair and looked back at Palmer.

"Palmer, I'm scared. I've turned over a rock and rather than finding another lifeform I've found a new form of existence. The inner space of it all makes me feel claustrophobic and trapped, and I can't stop thinking that Frank took a bullet meant for me.

After my encounter I was so sure of my purpose and now, years later, I'm in an existential crisis. I need some closure; what I thought to be a solution looks more like, I dunno, like a mind jail for Superman villains. I feel like I'm falling; I need a frame of reference. From where I stand my only way out is to follow Frank in."

Palmer could appreciate the difficulty she faced. In no small way were her struggles the motive for his original book. In large helpings was Ellie the motive for his new one. He began carefully.

"Ellie I think it comes down to your perspective. You can't be certain that Frank didn't make an active choice, nor can you judge it to be wrong, yet. It doesn't mean you need to die, metaphorically, or literally. Your fate is not written yet, and when your choice comes you will know what to do."

Palmer went to the steps and sat down next to her. He continued.

"One thing you told me about your original experience has stayed with me. They told you that what made the emptiness bearable was each other. You have given me back my faith Ellie."

She was about to provide a retort when he leaned over, pressed his finger on her lips and pulled his manuscript from his bag. He flipped over several pages and then read:

"I was immanent in Nietzsche's valley contemplating the death of God.

So, went the source...

'What sacred games shall we have to invent? Is not the greatness of this deed too great for us? Must we ourselves not become gods simply to appear worthy of it?'

I have witnessed deeds driven by engagement with our universe. In the greatness of these deeds we transcend our limits. Perhaps it is time we ceased portraying a God in our image and began to accept our species' Godlike deeds. Through this new narrative we can purge ourselves of dereliction and start to assume responsibility.

Maybe Nietzsche's fear was that we are no longer simple children of God. To aspire to be more than a child is not arrogance, and it is cowardice not to strive maturity and assume custody of our own destiny."

Palmer reached over and held her hand.

"Ellie, there are people on this world whose ignorance is not befitting of our achievements. I'd run away from many who would claim to represent my beliefs, many of whom, incidentally, would fight my attempts to enlighten them."

"I haven't told you this yet, but I have an entire chapter dedicated to your vision. Reaching out and travelling to explore notions of truth and beauty is not the role of a scientist. It is the work of missionaries.

What you have started as an explorer is an extraordinary journey just like those of Magellan, Marco Polo, Columbus and Cook. Don't you think that these guys had to carry doubts and personal luggage? Your journey, Ellie, promised to be to the stars, it may yet be.

Your predecessors are also missionaries the likes of David Livingstone, Xuanzang, or Angelo Secchi."

Ellie had only heard of Livingstone, and struggled to see herself spreading christianity throughout Africa. And retorted with, "Except they were religious and believed that there was some almighty being that ordained the paths of men!"

"No Ellie, that's where you're wrong. They simply had a conviction that we were not alone. Can you blame them for that?"

Ellie smiled, she had been cornered by a velvet mind.

"No, I suppose not. But it doesn't help me with the detachment of life from limb." She countered: "What if we *have* uncovered a path to heaven? let's be less ambitious; possible immortality? perhaps less ambitious still; a solution for euthanasia? It opens up a can of moral dilemmas! Next year we will have people lined up in wheelchairs for the insertion of Deep Brain Stimulation devices. Then they'll be lined up for connection to the rank of quantum computers,

and waving goodbye to their family's. Hey, why don't we hook it up to the internet? We can issue SQUID's to the world, and quietly fade away."

"Aahh! but that would be my domain Ellie. Science has always shone its light in areas where there are moral contradictions. The question is not whether this is right or wrong, it's simply whether we are ready to deal with it. Can you imagine, though, if the Vegans had also given us the blueprints straight up for the quantum computer and DBS?"

"Maybe," conceded Ellie, "but now I know how Einstein may have felt about the Manhattan project."

"You're getting a little melodramatic Ellie. There's no war now."

"What a strange twist," surrendered Ellie, "I get stranded on this godforsaken oversized asteroid with a philosophical preacher."

"And I find myself in a world blessed with an enchanting prophet, and a beacon to light the way. But for some odd reason she needs me to bring a candle," finished Palmer. Then he kissed her forhead.

+

Kent was coming under increasing pressure from the various members of the international consortium to promote technological spinoffs, thin the ranks, cut expenditure, and show any result that was demonstrably alien.

It was the derivative technologies that actually kept the boat afloat. The original alien blueprints had provided an impressive panoply of benefits in high temperature superconductivity, alloys, phase change materials and others. The challenge had become trying to maintain the original vision. The money spent on maintaining a state of readiness was perceived as wasteful.

He had seen several coups attempted, each had been extraordinarily sidestepped by a last minute crisis in the ranks of those that would moderate the SETI constitution. For whatever reason the fate of SETI managed to remain steadfastly on track. He was beginning to wonder if its fate was ordained by higher powers. He kept a tight lid on his suspicions, he didn't want to jeopardise the protective aura that sustained the golden goose.

Still, Kent had a budget. He knew the energy expenditure of operating the machine was almost prohibitively high, but he needed to ensure it was in a state of readiness if the signal should ever return. The rehearsals were just that. The candidates were well trained; they were all somewhat inspired by the thought of life in the cosmos; the results were as sterile as ever.

Kent called them his Saganauts. Drumlin would have called them an army of wasted scientific careers chasing little green men.

So, when the signal returned, Kent was ready for it.

## Part 3 Awakening

"Vertigo is the conflict between the fear of falling and the desire to fall."

Salman Rushdie

"It's exhilarating to be alive in a time of awakening consciousness; it can also be confusing, disorienting, and painful"

Adrienne Rich

### **Chapter 14 In Lumine**

Ellie was on the call list of the SETI Post Detection Task Group. Upon learning of the new signal she was expected at the SETI Institute posthaste. On arrival she was eager to have a few minutes on her own with Kent before anyone else. Kent called a meeting with her original team. It was here that Ellie told them of the preliminary success in their interpretation of the original machine signal.

Kent was not surprised by the turn of events. He understood that when science reached an impasse it was usually only surmounted through a change in perspective. The problem: waiting for someone to come from that new perspective with the right insights.

We probably knew all along, Kent. The energy required to sustain an Einstein Rosen Bridge is far in excess of what we could achieve, it may not even be possible. It makes more sense to accept the constraints of our universe and travel at light speed. Perhaps a Vegan has travelled here 'in lumine'."

Another of Ellie's original associates, Alan Fisher, was there collecting his thoughts. "So let me get this straight, you have

your typical 'mad scientist brain scanner contraption'. You replace the chicken on one end with a computer and a tape full of noise. You put on the headphones at the other end, and you get what?

"We don't really know yet," offered Ellie, "Artificial Intelligence? maybe an environment to support a computer model of consciousness? Maybe it could even transport sentience. It doesn't stop there Fish." Ellie hesitated. "Willie, just so that I don't sound like the only lunatic, could you explain."

"Well, our subject, Frank, was a special kind of guy. He was a quadriplegic. Anyway he had a range of technologies to try to help him. It made him perfect for the role." Willie looked at the ceiling. "Wow, this is so weird telling someone that hasn't seen it. Anyway, you've seen the movie 'Tron'?"

General assent around the room.

"Well, Frank died during one of the tests, maybe of his own free will. Anyway we decided to set the system in a free running state. The next thing we knew there was this emergent signal."

"Wow!" Kent stared at the ceiling. It was as if the walls and building were transparent to him, and he was staring at a distant star that only he could see. "And the signal looks just like noise? This changes everything really."

+

The SETI Institute was abuzz. Of course Kitz was there. He sought Ellie out, took her aside and, in a congenial manner, said that he had prepared a theatrette for the assembly to be brought up to speed on both signal discoveries. He added that it was important to conduct this briefing before any rash

decision to reboot the gimbal.

For once Ellie agreed with him. Though she wasn't certain that they would have the same agenda, or guest list. She also wondered if he had the information that Hadden Industries had recently provided to her. On impulse she took out her cell phone. She handed it to Kitz saying simply, "Make this a policy please".

Kitz looked at her with a sense of newfound respect. He took her phone and smiled.

"I'll see it done."

+

In preparing for the assembly there were heated discussions around the possibility that Frank's demise would be connected with the experiment. It was argued that providing a limited version of the sequence of events would avoid the possibility of erroneous attribution to his death.

The ethical dilemmas of censorship and telling 'half truths' were finally squashed by John. He simply stated that the current version of truth was incomplete, and that the subjectivity of eyewitnesses, such as themselves, often differed from those presented with objective facts. The General, a gifted tactician seasoned by his years of coordinating battles, drew a small book from his pocket. It was SunTzu's Art of war. He flicked over several pages and then read:

"In making tactical dispositions, the highest pitch you can attain is to conceal them; conceal your dispositions, and you will be safe from the prying of the subtlest spies, from the machinations of the wisest brains.

I don't want to suggest that the gentle folk out there or the

press are enemies. What I will suggest is that we are waging war on ignorance, and it has contrivances that will fool even me."

So it was decided to remain silent on certain facts until it was understood if his death was due to negligence. John said he would take personal responsibility for any adverse findings.

+

At the assembly were the usual array of close associates. About twenty people, many of them scientists and engineers, sat expectantly watching the SETI motif on a projector screen in the theatre of the SETI Institute. There were the familiar faces of those involved in the previous International Machine Consortium construction team, and there was also a smattering of new specialists. Ellie guessed that these were probably Government or Military researchers. Many of them were a part of the SETI Post Detection Task Group. She was relatively impressed, and was forced to contemplate Kitz's motives for such an inclusive team. It was probably containment. Those that would eventually know anyway, should know under controlled circumstances.

The assembly agenda had been approved by Kitz and was to be chaired by Rachel in her capacity of Acting Deputy, Chiefs of Staff. As the various scientists and dignitaries entered the theatrette they saw four seats arrayed at the front where Rachel, Ellie, John and Kent sat. The tone of the presentations had been set through a carefully prepared preamble. This stated that there had been important research in parallel with SETI, and that recent findings would have a significant impact upon forthcoming discussions. The guests were then advised that the opportunity for questions would be provided only after the new implications for SETI's signal were explained. The three teams were introduced through Ellie, John and Kent. Their convergence was glossed over.

Rachel then introduced Ellie's team. Willie began with the background on the extraction of the telemetry signal and the analysis through the Quantum Computer. The screen was used to some effect with the visualisations provided by James. While he provided coverage of encryption collisions and key extraction he stopped short of the work at The Fishbowl.

Rachel then thanked Willie and introduced John. The activities of the military research, the Deep Brain Stimulation device and 'The Fishbowl' were very briefly outlined. Images of the team and facility helped provide the context for the presentation. Frank was strongly acknowledged for his stoic contribution. A photo of Frank adjacent to the pedestal in The Fishbowl was shown, he was smiling. His death from a brain aneurism, was simply attributed through 'natural causes'.

By now some in the audience had started to piece together their own conclusions. Many figured that if there hadn't been a significant success the two teams would not be here at SETI, and they would probably still have possession of their phones.

Rachel then called on Palmer Joss to deliver the finale.

"My involvement in this project has been peripheral." He began.

Palmer walked down the aisle from the darkness at the rear upper ranks of seats in the theatrete. Thus he imparted the impression of a guest at a science forum. No question about it thought Ellie; here was a consummate spiritual politician.

"I'd only recently met Frank, and I wasn't there when he died,

but I know him as extraordinary."

He had reached the theatre floor. He turned, faced the crowd and leaned back against the theatre's podium.

"Putting aside any religious connotations there's not a human alive who has not contemplated whether they could, or would, attempt to communicate from beyond life."

Palmer looked around as if this was his congregation. As a well acknowledged scientific ethicist it was arguably just that. He knew how important his role was; He needed to provide his ethical credentials to this scientific audience without overstepping the spirituality side.

"To those involved in Frank's experience, whether as a disciple of science, or simply good books," he acknowledged the scientific team and then spread his arms in humility at 'good books', "the conclusion is very compelling that this is exactly what Frank is trying to do.

As a spiritual person I have often scrutinized any scientific process that steps into the spiritual field. Science and faith are now converging on consciousness, and I need to know the scientific community will remain as skeptical as if it were dealing with spiritual healing, stigmata or speaking in tongues.

I've seen evidence of an attempt to reach out through a message from a new kind of computer. The computer's 'programme' was recently discovered and adapted from the original SETI event. Through means that will soon be explained, this system has spontaneously shown a signal unique to Frank.

Although I am unqualified to provide the scientific credentials, I am qualified to recognise the sanctity of life. And so, I feel that physical science is morally bound to

explore this phenomenon, as surely as medical science is bound to the hippocratic oath.

My role here is to help if there are any ethical dilemmas you feel like discussing. I leave the science to you, and I wish you the best."

Rachel stood and thanked Palmer before asking Ellie and Kent to officially open the occasion. Ellie stepped up to the podium. This was an audience of peers. She was in her element.

"As Palmer has said the evidence of a connection is compelling. It takes the form of an emergent property from a cyclic closed loop system. This system was initialised with the signal artifact from the first SETI event and Frank's interaction. We are yet to fully decode our preliminary results, though we feel that it is highly likely to lead to a form of contact. Further work will involve the interpretation of the emergent signal into an interface.

The bigger implication right now, and what really needs to be addressed by the people in this room, is this: Can this information help us deal with the advent of a new SETI signal? Should we wait? Should we proceed? and if so, how?"

At this point Ellie stood and glanced at Willie. Willie had a small pile of copied notes. He handed a bundle over to her. Kitz had provided suggestions of what should be said at this stage and Ellie had worked with Kent to adjust it for this audience.

Ellie continued. "My team will be available for questions in a special session in two hours time. We are now passing out briefing papers for that session. Please understand that this information is currently highly speculative, and should not pass beyond the participants in this room. It is not worth

anyone's reputation to make this public yet.

The more public purpose, and one which should remain paramount, is the arrival of the new signal. This will need to have an official statement, and an agreed press release as soon as is practical. Before this is developed I think Professor Kent Clark would like to introduce us to this new signal." Ellie then guided Kent to the podium microphone.

"Thank you Ellie. The developments Ellie's team bring to this event are news to me. From what I've heard these results are relevant and, although embryonic, have staggering implications.

This leads us to a discussion of three events: the Betelgeuse supernova; the return of the signal and the new results of Ellie's team. This new signal originates from Betelgeuse and consequently I believe that it is reasonable to connect the return of the signal to the supernova event," Kent paused to allow the murmurs of assent to subside. "This leaves us to contemplate the original SETI signal, and Ellie's developments since then."

"Okay, so with some artistic license then; you freeze frame your soul and send it across several light years by electromagnetic waves, all in the hope that you get reconstituted at the other end. The team here on Earth then work steadfastly through several milestones and disappointments to reveal signs of life. Can anyone conclude that the return of the new SETI signal could be the direct result of Ellie's research? Could Frank's death be related to the Betelgeuse supernova? Although there may be some degree of poetic consolation, I doubt it. We must focus on the physics rather than become sidetracked on metaphysics.

So, let's examine the new signal. Based upon a results from interferometry It appears to be a collimated beam of

unknown breadth. This suggests it is roughly focused towards our solar system, perhaps to conserve power over this long journey. The signal is now forty-eight hours old and it differs from the original signal since it has no embedded video of either Hitler; his defeat; the Kennedy assassination, nor is there an episode of 'I Love Lucy' or 'Puff 'n'stuff'."

A muted laughter arises from some in the theatrette before Kent continues.

"Aside from the same prime number pattern it appears to be noise. Now we know about Ellie's research this is interesting, and may bear consideration. It is also somewhat a relief, or we would have every hobbyist on earth decrypting the signal and 'contributing' to the research effort. As it is we can hand on heart say that we are equally as perplexed as they are.

Let's return to the supernova, a cataclysmic event. One theory is that the signal is a mass exodus, and that we are a possible recipient of refugees. Another theory takes the opposite view, and that it is a call for any survivors of the supernova to 'beam themselves over'. Of course it may simply be a news broadcast."

The muted laughter around the room allowed the acceptance of the news to be gauged. Kent's droll delivery had taken some of the tension out of the room. He moved to accepting questions and discussion.

The questions included probes to guess at how long the signal would continue. Those that strongly believed in the portents of an alien exodus suggested urgency and that life may be extinguishing as they were speaking.

With questions raised about whether to 'drop' a new recipient or a simple recorder in the machine the nature of the machine was brought back into focus. Was it a

telepresence, teleporting, Einstein Rosen bridge, or perhaps an advanced Ouija board?

Eventually Kent proposed they simply progress with the next manned drop.

"Our teams are rehearsed and ready, and I have had the privilege of having heard Ellie's briefing in advance. I would like to propose that we progress with the use the gimbal machine, and that until we know for sure whether we have a constraint of a single shot event per candidate we employ different participating individuals each time.

### **Chapter 15 Paradox**

Debate turned quickly to the selection of candidates to send into the alien gimbal. Palmer was offered the journey and an accelerated training schedule. He declined, suggesting that there were more worthy recipients, and expressing a desire to focus on the developments within Ellies team.

Four candidates were shortlisted based upon a variety of backgrounds, testimonial statements and interviews. There was a musician of Irish descent, with a Doctorate in Political Science; a former archery Olympiad, with a degree in Philosophy, majoring in Artificial Intelligence; a Neurologist, who had performed work with Médecins Sans Frontières, and a popular and philanthropic author of novels on the Human Condition and self improvement.

Each candidate was subsequently provided with the background of The Fishbowl research. The current theory that an encounter represented only a cognitive increment was explained. The implication being that their contact was likely to be somewhat brief. The machine was operated twice before the enigmatic signal again stopped.

Each candidate returned to report an experience similar to

Ellie's, with the understandable absence of Ellie's father. Both, however, encountered a figure of significant influence in their life. As a control the backgrounds of both candidates had been explored to identify any potential mentor figures.

The first voyager was the musician, Martyn O'Leary. He had been inspired by his Cello teacher, he reported landing amidst the most beautiful cello music in a valley of reverberation that permitted the music to sustain itself almost impossibly. Few words were spoken but he was provided with new insights into many levels of harmony as he played a duet with his tutor and the echo of the cello against the valley walls.

The archer, Qui Fan, had met atop a mountain of massive boulders and had meditated with her instructor to control her breathing and tune in to her heartbeat. They also discussed the 'chinese room' thought experiment of conscious states.

Just like Ellie's experience both contact events drew tantalisingly close to an awakening before they were drawn inexorably home.

Two signals were captured and stored. The telemetry data was given a perfunctory analysis by the SETI based research team with their available tools. Before long the decision was made to abandon analysis and pass the process on to the other teams. Copies were placed in the SETI archive, the SETI Research partition, and an Offsite copy was established. Without ceremony a set of copies were provided to The Fishbowl research team.

Many at SETI were very relieved of the developments at The Fishbowl, despite the specifics of their research being not scientifically mature enough for publication. With little alternative Kent decided that SETI itself would remain the public focus and buffer any pressure for as long as could be credibly sustained. Any matured results would be released only after the team had prepared itself for the inquisition that was sure to follow.

The rest of the Post Detection Task Group agreed not to elaborate on The Fishbowl research until such time as Ellie authorised a result. She was urged to hurry and they offered whatever resources they could avail to speed up the progress. Many of those present had suspicions that the project may become militarised. There was an unspoken resolve to provide unyielding support to Ellie, believing that she would not allow the findings to be diverted or buried.

The popular '4front' magazine produced monthly articles and editorials on the future. It had a motto which was:

'In four years time, but in your time today'.

The magazine ran the story based upon the SETI press release, whatever it could garnish from the scientific community and it's myriad social network feeds. Kitz and the fear of professional suicide had ensured the code of silence from those in the know. The journalists had the sneaking feeling that something was afoot but they failed to dig up anything.

The headline article read:

# "Contact Enigma"

Forty-eight hours after the mysterious signal reappeared the SETI Institute was still out of contact. The internet went into overload, and the most popular search query was SETI@home despite being shelved five years ago. The article then continued...

The SETI radio telescopes were not alone in the detection of the new signal. The world, seasoned with knowledge of the previous event, had already begun to capture and speculate.

Most of the science, and many of the decoding capabilities available to SETI are widely replicated and readily available. Groups spontaneously sprouted with the latest everywhere speculation. mathematical constructs. algorithms and contributions to the @home servers. The race is now on to decode the new signal which carries none of the previous hints or lessons, and appears to be nothing but noise.

SETI has tried to provide answers, and yet just like the public it still has nothing to go on except for the noise. Spokesperson Professor Kent Clarke said of SETI, "We're the only organisation geared to utilise the Alien Gimbal machine which is still likely to play a significant role in the interpretation of the second signal." The Professor was referring to the white elephant constructed by the International Machine which Consortium, and on Eleanor Arroway embarked on a four second journey fifteen years ago causing a major enquiry into its complete lack of results and possible conspiracy links to Hadden Industries.

Although lacking the previous evidence compelling the use of the machine this time Clarke has said that SETI remains of the position that the use of the Human Gimbal machine is the only response under serious consideration. He added that several candidates had been readied, and that until any new evidence came to light, or the signal ceased, SETI's recruited candidates will be gearing up for their journey in the machine. At the time of printing the first candidate had participated, while another candidate was already being prepared for their 'journey'.

4front have been advised that at this stage there are 'no surprises'. Professor Clarke said that another contact event like that of Eleanor Arroway has occurred and has yielded 'new and unique but similar telemetry data'. The data has been called 'challenging' and is currently being analysed by SETI. The cry for access to this data from the world's ameteur and scientific community is building. SETI's official response is that applications for access to this data can be made through the same channels as those who wish to access the previous SETI data.

The candidate recently dropped in the machine reported an experience 'consistent with the previous event'. This can readily be interpreted to mean the anticlimactic duration, and useless telemetry, of Arroway's contact event. It also implies the same hallucinatory experience originally reported by Arroway. The next edition of *4front* will endeavour to include an interview with these candidates. Arroway, meanwhile, remains unavailable for comment.

The recently reported Supernova event of Betelgeuse is widely considered among astronomers to be practically coincident with the signal's arrival. Clarke said that although no proof existed on whether the two events were related the proximity of the source of the new signal to Betelgeuse was compelling. This connection was a strong thread of exploration. SETI would not be alone in the assumption that these events are too close to be attributed purely to chance.

SETI also reported that a special task force has been established to decode the new signal and it's telemetry data. The position of SETI is that since the new signal bears little resemblance to the original transmission it's analysis may be even more complex and may take years to interpret.

The investigation task force is said to be conducting two lines of exploration. One that has produced early results is Headed by General John Meredith of DARPA. The other line of analysis is understood to be more speculative, and still embryonic.

The analysis performed by DARPA called upon the capabilities of some of the world's most powerful supercomputers to perform a complex inverse fractal transform on the telemetry noise of Arroway's event. The General's credentials here include exploration of telepathic and mind prosthetic research. Some twitter hashtag trends suggest that this again raises the spectre of a conspiracy.

The processing consumed several months of supercomputer time, and the output appears to be the telemetry of the drop event. The result appears unremarkable, and by itself would consign the event to the "Busted Myth" bin. The new interest seems to be in how the forward transform could possibly have been performed in six seconds. Further research is now being performed with other transforms as well as fractal detection, extraction and encryption (see our supplementary section on the resurgence in Fractals and Transform Theory).

It is also thought that the primes provided in the signal may hold a new key. If this is the case there may be serious implications and new research into cryptography. SETI have now revived their @home project to calculate these other transforms over the telemetry signal. This news, while gaining popular support, accompanies reports of the widespread appearances of Ford Prefects.

In response to doomsday prophets the Douglas Adams fan club has provided a press release on their website saying that they have investigated the situation. They recommend 'Don't Panic' and that an intergalactic bypass is not on the Vogon Planning approvals.

The article mentioned several of the other theories, the political reaction and calls for new funding. The activity at SETI was frenetic. Ad-hoc plenary sessions were conducted and working groups were assembled.

One of the strengths of SETI now was the preparatory work of the Post Detection Task Group. They had engaged a Public Relations organisation on retainer. This organisation was now involved in the progressive dissemination of information. This tactic provided sufficient delay to keep the public perception high, the information scant and the press off the backs of those directly involved. Everyone knew that the time would come when the spin would be recognised for what it was and the world would want an outcome, or it would bring SETI to account for its failure to deliver. The hope was that boredom would set in.

Following the anticlimactic conclusion of Ellie's drop through the gimbal in the original Contact event the theorists had gone into a tailspin. They could be divided into several camps. All of these camps stood juxtaposed at the SETI institute.

Some preferred to stay firmly in the well defined area of 'experimentally verifiable and epistemologically justified' research. They were careful, though, to steer clear of the conspiracy theories of skeptics. Instead they argued that Ellie's experience was one of faith and belief, and that the truth required a justification that could no longer be acquired. This group called themselves the "Gettier camp."

Some believed that Ellie had in fact travelled the distance in the time she reported. This theory invariably relied upon some form of time dilating wormhole and was supported through the apparent interconnected 'network' Ellie had seen. The popularity of wormholes in pop culture provided a further tinder box to sustain this idea. Disillusionment was common once anyone had subjected this idea to detailed analysis. Those that found relativistic enlightenment sought out other theories or went back to tenured positions in the high energy physics laboratories. Some stalwarts in the group were reluctant to acknowledge any other explanation. They called upon Occams Razor and dictated that the simplest explanation was likely to be the truth.

Ellie squirmed at the notion that the argument she had used to dismiss the existence of God was now being used as justification for scientific tradition and narrow mindedness. She sometimes wondered whether the cyclic 'paradigm paralysis' that infected science was the original root of religious fervor. When pressed the group called themselves the "Einstein Rosen Bridge camp".

Others had put forward ideas of telepresence or immersive virtual reality. This could comprise anything from a foreign presence, a shift of Ellie's consciousness, or perhaps a mutually shared virtual environment. The network that Ellie had seen was explained as being a part of Ellie's consciousness travelling to experience this telepresence.

In all cases the fly in the soup was relativity. The idea that information could flaunt this most fundamental law through the use of the gimbal machine created a 'Pandora's Box' full of paradoxes. The only glimmer of hope lay in the fourth group.

The telepresence advocates had eventually spawned a splinter group that explored whether one or more parallel universes were involved. This meant there was no need to traverse distances and also that the information in one universe could not create paradoxes in another. Marty McFly could not exist in both universes, the same game of sport mav have different results. Biff would have been disappointed in his theft of the Sports Almanac. Again Ellie's network was portrayed as a manifestation of travel across multiple universes. This group had begun to gather many followers and had become a sub cult, generally attended in Internet forums by Sci Fi aficionados. They had begun to call themselves the "Many World Order".

The appeal of this was particularly strong among those theorists that held true to the Many Worlds Interpretation.

Now, the various working groups at the SETI Institute moved quickly into the nature of consciousness. Many scientists wished to replicate the successes of The Fishbowl. Although scientific method would have dictated this to be the 'norm', Palmer Joss stepped in and suggested that before another Artificial Intelligence was brought into existence, the path of the current one should be played out a little further. Kitz was in agreement although perhaps for very different reasons.

John and Palmer were useful in keeping the ideas in check. If it could not be adequately explained, it was inelegant. The test of elegance and aesthetics in any theory was seen as a way of determining whether it was being unreasonably and tenaciously held beyond its usefulness.

Several SETI scientists as well as Palmer, John, Fisher, Kent, James and Willie were in a tutorial room. There were several half filled coffee cups, one provided a 'vi cheat-sheet' and sat adjacent to a chipped mug with an anecdote telling all who would read it that 'Physicists do it relativistically - the faster it goes the more massive it gets'. A third showed the four Maxwell equations in a speech bubble and a bearded man with the caption 'Let there be light'. They all had drips down their sides suggesting that they had not actually been emptied for some time, and had simply been topped up perpetually.

The cups sat cold and neglected upon a freeform shape made of trapezium desks and strewn with papers and pens. A whiteboard stood in a corner of the room with the hieroglyphics of a mathematical derivation. Evidence of various finger smearings and scribbles showed the calculations had evidently not worked out. It also stood as a reminder of the absence of any eraser.

The debate was moving towards the observation that the signal seemed to disappear whenever one of the hypothetical consciousness signals had concluded.

"Folks, we don't understand consciousness enough to really know about 'observation'. We are now in the hands of philosophers, psychologists and anaesthesiologists. Maybe consciousness has a form of entanglement with corporeal existence. This would be consistent with the findings obtained through our Quantum Computer. If the wave collapses it becomes real and consciousness awakens. Maybe there is no risk." "Whoa, Whoa, Whoa! What are you saying please?" pleaded John Meredith.

Palmer, meanwhile sat with his arms folded and simply smiled. He was very much enjoying this discussion, and was simply waiting to see who would gainsay Ellie's theorem. He had already been privileged with her first rehearsal.

Ellie had been trying to avoid having to provide too much pedagogy. She had now resigned it as inevitable "Well, there are two main interpretations of Quantum mechanics: 'Copenhagen' and 'Many Worlds'. Both try to explain superposition, or 'being several things at once'; like right and wrong".

"Like Schrodinger's cat being dead and alive?" Suggested Palmer.

"Exactly, or maybe 'up' or 'down'; 'left' or 'right'; 'clockwise' or 'counter'. Anyway, the state of something is not actually determined until it is measured. This sounds obvious, but it is actually quite problematic. Bohr and Einstein spent years debating it, so the Einstein group came up with the Einstein Podolski Rosen paradox. It is one of the most counterintuitive ideas we have, and it pushed Einstein to ask Bohr "Do you really think the moon isn't there if you aren't looking at it?"

If, for argument's sake, we were subatomic particles, we could conduct an experiment that looks like a magic trick. We arrange with our gorgeous female assistant that a tickle on her foot represents asking a predetermined question, and she should wiggle her left toe for 'yes', and right toe for 'no'. Then we saw her in half and take the top part to the North Korean US Embassy.

Now when we feel a rumble we tickle the woman's foot. She wiggles her right toe to say that it wasn't a North Korean

nuclear missile, and this information travels faster than light. At the quantum level the two halves of our 'assistant' are entangled

BUT! We physicists are uncomfortable with the idea of faster than light travel because it violates causality, so we scramble around looking for 'hidden variables', or a new definition of 'locality'. It is looking very much like 'hidden variables' are out. This means 'locality' may be an obscure idea; here and there can be one and the same.

This very real phenomenon depends on managing decoherence, which happens when the system finds interference such as a simple measurement. Our meeting the Vegan A.I. is just that."

Ellie went over to a whiteboard. She used her sleeve to scrub as much of the greek characters off as she needed. "This is the double slit experiment. You know that light can be a particle or a wave don't you."

General assent around the room

"So the thought experiment goes like this: Over here in Vega on the right we do a double slit experiment, but with a pair of entangled photons." Ellie then drew a rough outline of slits and a screen. "One photon goes to the double slit and the other shoots off into the distance. Over here on the other side of the whiteboard is Earth. If we measure this photons direction we might be able to work out which slit it was going into. If we do that it will make a single peak instead of an interference pattern. If the Vegans measure it as a peak they will know we measured the photon. And yes even though the photon arrives here in Vega much earlier than the photon on earth it's result will be stalled until the measurement on Earth is done or not. At this point the information instantaneously travels the 25 light years to Vega. Instantaneously meaning infinitely faster than light. In fact, as if they were the same place.

Let's take our assistant again. She lives on Vega, and while there she is metaphorically sawn in half. Under careful conditions one entangled half is sent to Earth. Just like Schrodingers cat she is put in a box which effectively grows at light speed from Vega to Earth. For 25 years the two halves remain entangled. After this time our assistant has either arrived at earth or not. The box is opened here on Earth, and we find our assistant, whole again. On Vega however her entangled half must now be gone, and finding this they turn off the transmission.

I'm troubled wondering who was watching for the interference pattern as well as how they switched off the transmission since they would have to be in the box as well. I expect we may have to ask our AI friend how this works, it probably needs parallel universes in there."

Everyone felt obliged to help John understand. It may not have been elegant but by sheer weight of numbers John was forced to concede its plausibility. Eventually Ellie concluded.

"So in my case the Vegans prepared for a departure when they first got our signal in 1939. Someone's consciousness was entangled locally in Vega and in the transmitted signal. It was seen to have departed then because it arrived here to be measured as a recorded and translated noise."

John shrugged saying sardonically, "Thanks, that was a big help. Who has an Asprin?".

#### **Chapter 16 Virtually real**

With the media engine tuned, the now augmented Fishbowl team resolved to return to their work. Goodbyes were said, and Kent told them that much hinged upon what they did. He

would keep them abreast of any developments, and he trusted they would let him know as well.

Once back at John Meredith's Lab some of the original SETI team were called upon to represent the geometries from Frank's signal into a viewable form. This turned out to be one of the simplest tasks of all. Assistance came from far and wide. The modest Laboratory run by John Meredith was being put through a barely sustainable growth phase. Security enhancements and new protocols were starting to create some confusion, and many new staff were housed in temporary buildings annexed to the main one.

The range of contributing disciplines was also growing with a major injection of experts. This saw cognitive neuroscientists, engineers, psychologists, cvbernetic programmers of inference engines, knowledge polymorphic code and engineers and holonomic theorists joining the program. The astronomers had again stumbled onto something they were only just getting tooled up to understand. Phrases like; DC glial field potentials, neural networks or Strong A.I. were frequently heard in the cafeteria along with lively debates on the emergence of consciousness and philosophical discussions on the distinction between 'attention' and 'intention'.

With the now generated multiple copies of the signal in archive Willie sought out some associates he had encountered at the university, avid enthusiasts of Conway's game of life. This was a construct that created a 'universe' from an grid of 'live' or 'dead' cells, and some simple rules. Through a construction of various 'gliders' they had recently achieved a self replicating 'space-ship' and a "fractal life". Willie was keen to explore whether they could see the same patterns, with mutations, across the sequence of acquired signals. He also joined in with a group debating the fusion of philosophies as some tried to explain Holonomic Brain theory. The similarities of the math provided some inkling of a common point, but it remained a field just out of reach for him.

Much of the team had seen this before with their involvement at the original signal discovery at the VLA. The chaos that ensued created a pilgrimage of extraordinary proportions that descended upon the VLA. The multidisciplinary teams that now converged added a similar air of excitement with a welcome omission; the Woodstock carnival element of the first event.

Where previously there was modest accommodation there now came makeshift offices and laboratories. Staff were also provided with alternative accommodation and the local hotels, restaurants, bars, and coffee shops experienced a boom in their economy.

Ellie was originally billeted in a well regarded Bed 'n Breakfast with some of the others from the core team. As a result of the enhanced security protocols she and her team were transferred onto the military research campus.

Willie bought a bike. It was not unusual to see him risk life and limb as he donned his ipod and dodged traffic while listening to 'Return to Innocence', '100Billion Stars', 'Walking Away' or 'The Great Beyond'. He would take excursions, sometimes to smuggle in Tequila, and return to the security gate at the southern end where he would wave his card at the guards. They would generally recognise the madman on the bike and permit him entry. At the ring road he would ride his bike across the parade quadrangle, around the administration building and towards the cafeteria area where there were some bike lockups.

It was remarkable how at home he felt. It was just like any

University campus except for the preponderance of uniforms. Even this didn't bother him and he began to feel a degree of reconciliation with his parents' military involvement. Of course the real test would be when the research outcome was ready to be released to the public. In any case he could not see how the military could keep all of this a secret for much longer.

James soon followed suit, and the two established their own cycling routine, sometimes going in pairs. James liked to visit a bakery that had scrolls that came hot from the oven at 7:30am. He would fetch several and have them back for the team warm, and only a little squashed, by 8:00am.

Eventually John had someone requisition a small case to protect James' precious cargo. He would navigate the steps and corridors to a kitchen where they would meet and feast. Nearby was the skyway that connected The Fishbowl to the rest of the base.

The building that contained The Fishbowl began its life housing a wind tunnel. This became redundant as computer modelling improved the accuracy and range of the results. Its construction had a high self supporting roof with a mezzanine level which was the vestigial remains of the original cyclic wind tunnel which required access to both the upper 'out' and lower 'return' experimental platforms.

With the building being remodelled for The Fishbowl the lower access had been shut off. The upper tier then became the only point of access and egress to the sphere. This area had been fitted with the control laboratory and was where the team had conducted much of its work during Frank's periods in The Fishbowl.

The lower area housed all of the control instrumentation, cryogenics and power. The system had been set up as a

double jacketed environment, much like a thermos flask. With the primary criteria to eliminate external fields within The Fishbowl the lower section also had to comply with stringent isolation requirements. Ultimately the lower area was only easily accessible through an access hatch in The Fishbowl, affectionately named 'The Jeffreys Tube'.

On the other side of the skyway several of the rooms that fed to the corridor across the bridge had been converted to accommodation for the research subjects. Frank's room was among them, as was the debriefing room, a kitchen area, a medical centre with a sterilised room for the care of recipients of the DBS, and a wheelchair-friendly hygiene area, with showers and baths.

On the day the team moved into the new accommodation they celebrated a housewarming in the kitchen area. John announced that he had not closed the door to his previous research activities, he was thankful for the injection of new ideas and new direction. He went on to announce that he would pull back from direct involvement but hoped that they would keep him informed of any significant outcomes. Before departing he promised that he would return fortnightly to keep abreast of their progress. John also vowed that if they needed anything he would pull whatever strings he could to make resources available.

He could not be drawn on what he would be doing during this absence.

+

Willie's discovery that The Fishbowl signal contained some form of geometric notation had led to a campaign of targeted reconnections at SETI. Some of the old team members were being reunited
Dr Merv Stanley was a gaming genius that had found a calling within the first SETI program contact event. When the means to decode the original signal's images into 3D had been found Merv was tasked with the conversion to a more convenient 3D geometry. This was used to build the CAD diagrams of the original machine and needed adaptable visualisation to resolve ambiguities for the actual construction process. Several readily available technologies had been adapted and drew upon gaming and movie production industries for real time simulated flythroughs and data validation through virtual reality.

This new signal simply added the dimension of time. Merv took the geometries and processed them as if they were a games playback. Within a week he had interpreted and was able to represent the video signal through a computer to a 3D TV. When viewed, a remarkably true to life view of Frank appeared. He stood, surreal, in the magnetically shielded Fishbowl adjacent to his wheelchair. The precision of the scene imbued the sensation that fidelity to life could be dispensed with in favour of platonic perfection. This rendering had attained efficiency in its digital representation but the complete absence of imperfection did not simply infer perfection, it smacked you in the back of the head with it.

"Research Base, Research Base, Research Base, this is Frank Valetti, please respond. I am in Remote Base and would like to report in. Message follows."

With the radio protocol now dispensed Frank went on to speak. "My friends, I don't know when you will find this little 'message in a bottle'," said Frank with a small smile. He continued, "I am confident you will though. I already feel that more time has transpired than normal; so you have somehow given me more than I could have experienced in a single event. I also feel a sense of continuity, and I have sensed you at times; perhaps when you have been near the Fishbowl. And so I've created this message, unique and unchanging in the hope that it remains obvious in a backdrop of change.

I have heard many of your ideas and theories, and though at the time I understood only some of it, I understood enough. I want to thank you all for letting me be a part of it, and become a beneficiary of the breakthroughs. Even with my humble beginnings I understand the astounding thing we have discovered. I hope we can soon meet again.

It was during my second event that I felt I really understood what was being offered to me. I could have left then. I gave it some thought and discussion with my guide. I came to realise that I first needed to let you know that you were on the correct path. I needed to come back to you one more time.

I had already chosen this path for my third event. In my state of health I could not be certain of a fourth, and I wasn't sure you would permit me to go if you knew my intentions. Finally, I also felt it such an evident truth, that it would not be long before you too would figure it out. I could not be sure you would still offer the choice of euthanasia when you did.

So, now I have a gift for you. I have been mentored here. I have become a part of something... bigger. And so I have asked for help to pass some of this knowledge to you.

The original machine has a purpose and implications beyond imagining. The Fishbowl is humanity's stepping stone. I hope we can use it to create a place of commune.

I recall talk of transforms and reading books edge on. Within the commune time does not cease or accelerate, it simply moves temporarily at a right angle. This allows a moment to be drawn out further so that we can commune. Life can jump the gap, I have simply chosen not to."

Frank went on to explain that Ellie's journey began with a low frequency magnetic field stimulus she perceived as a vibration. Higher frequencies and more detail were added through a feedback process. Eventually a map of her physiology was built, and it became possible to engineer the stimuli, interpret the result and provide more stimuli.

In short, even before Ellie was dropped through the gimbal the system was learning how her mind was mapped. When she was at the core, the engrams of her experience were laid. The subsequent recording was an inevitable result.

Frank finally explained that the seed program had already been primed to understand human physiology. There is no longer a need to perform the preliminary stage. The Commune can actually be accessed quite readily within an environment just like The Fishbowl which simply needed the addition of feedback to the electrostatic and magnetic coils.

Frank concluded saying "Please conduct some cycles while present in the fishbowl. Acknowledge by employing radio protocol and the call signs I have specified. I will leave further messages in this bottle when I obtain acknowledgement. In this way we can close the loop and establish reliable communications. I look forward to seeing some of you again.

'Science Base' this is 'Frank Valetti'. I require a Communications check, over.

Come in Science Base."

The message was played several times by those at The Fishbowl before the activity again became frenetic. The message was dissected and analysed and plans were drawn up. This culminated in the conversion of The Fishbowl into the Transcranial Magnetic Stimulation system that the team had considered as an option in earlier discussions. Without this new information the team lacked any guarantees that this idea had merit over any others of the multitude they were considering. Frank's voice from beyond time and space had now very much provided wings to it.

Frank's message also introduced some interesting challenges in relation to the isolation required. In order for the new configuration to work nothing could be implied from the currents and charges outside of the experiment. The Fishbowl needed to be fully self contained. All control systems, signals, the quantum computer and the input and output recordings needed to be isolated within The Fishbowl. With this work performed it meant that anyone could now join Frank in his Quniverse.

The Fishbowl control room was refitted with shielding to accommodate the isolation requirements. This alone consumed several weeks before the first attempts to renew contact could be made. Many early attempts failed to provide real time contact with Frank. However, with the progressive cycling and analysis of the signal, Frank was able to provide feedback through the output signal he had devised.

After several iterations and progressive improvements in signal levels, feedback polarities and isolation they became confident that the next immersion would produce actual contact with the Commune space.

+

John returned to congratulate the team, and to help with the next decision: who to send? Willie expressed an interest while James held strong reservations. Ellie said she had already had a chance at being test pilot and John said his rank precluded his involvement. No-one could honestly say they knew how to prepare or what to expect, even though the risk to life and limb appeared marginal. Willie quietly stood aside when Palmer requested that he perform the first trial. All conceded that this was now probably more of a spiritual journey.

Palmer was taken through the preparation and fitted with a simple white coverall. Because of the potential to create interference with the generation of magnetic and electric fields all metallic items were removed. When Palmer confessed to having dental fillings he was told they would be okay, but was asked if he had any metal implants or shrapnel wounds.

Palmer received farewells from various people as he was taken through the preparations. Willie and Ellie entered The Fishbowl in the latter stages, and approached where Palmer sat reclined in Frank's spot. The dentists chair had remained, although it had been modified for access by able bodied recipients. Willie broke the silence, "Hey preacher, good luck! Say 'Hello World' for me."

"Yeah, thanks Willie." The reference to the typical output of a computer program's 'maiden run' was lost on Palmer.

Willie leaned over and grabbed Palmer's shoulders. He gave them a brief gentle shake and pretended to examine some of the fittings at the console. He continued, "OK, just so you know what to expect, with Frank's new configuration the whole thing is sped up. It's no longer eighteen hours in our time, in fact, its only about ten minutes. I'm not too sure what that means. Does it mean that our 'physiology' isn't very efficient, or does it mean we get one hundred times the experience in that ten minutes? Anyway, Bon voyage." He winked and provided a thumbs up. As he exited The Fishbowl he nodded and smiled at Ellie.

Ellie walked over to Palmer at the locus of the spherical room.

"You will be completely isolated, you know that. You are the proverbial Schrodinger's cat in so many ways it scares me." Ellie shuddered to contemplate the chance of survival of this metaphorical cat.

She then indicated a control console on the chair. "This green button here is the 'play' button. It will light up once we have closed the doors and we have isolation, and will go amber when you press it. The last recording is already loaded with the keys." She shifted her focus to a second red button. "This one is the exit. You can press it at any time but after thirty minutes we will open the doors anyway. This is the other button we spoke of. It administers some mild anodyne gas, more to relax you than to put you to sleep. We believe you need to be conscious for the process to work, and we don't want to suppress your ability to respond. You can press it if and when you want; although we suspect that instead of inducing the connection it might suppress it."

Palmer looked carefully at Ellie. "I'll be fine Ellie. I've been through the briefing and I know all of this. I'll see you soon."

"Don't get lost," was the last thing Ellie said before the room was evacuated.

Once up in the control room they monitored the systems that prepared The Fishbowl for isolation. The closed circuit TV's became snowy and the sound noisy until noise gates attenuated the audio to silence. Arrays of computer screens displayed digital readouts of the internal sensors, these all approached zero.

The prevailing magnetic declination was measured from remote sensors. Internal coils worked to nullify The Fishbowls

internal magnetic field. External coils simultaneously compensated any residual field to assure realignment to the prevailing magnetic declination. This would leave The Fishbowl transparent to any external measurement. Electrostatic field plates performed a similar function.

In The Fishbowl the light went green. For what he figured was about ten minutes Palmer felt very little except for some mild vibration, this progressively dissipated. It left him wondering if he was immune to the whole process.

### **Chapter 17 Palmer**

The room blurs away, fading to black. The black is subliminally noisy, something like the white of snow on a TV slightly out of tune, or rough like the texture of sandpaper. There are regions of reddish hue just like the light filtering through eyelids. There is also a soft brownian hiss in the background, similar to the static between radio stations or waves on a distant shore. The hiss has always been there but it seems strangely amplified by his isolation. A subdued click indicates that the system may have kicked in. The darkness becomes sharper, more absolute. The hiss disappears.

A single perfect tone like a bell sounds as a single point of light appears. The point stretches out to become a vertical line while the sound splinters into several musical octaves of the single tone. The line stretches out to become a plane of white across the full view as harmonics are introduced into the sound. In the same way a second green line appears horizontally across, dividing the view. From the sound comes a single pure chord. This line then extends downwards as a plane, slowly at first but then consuming the lower half of vision as if the ground had just marched from a far horizon. The sound again fades to silence. Palmer knew that this was a calibration routine, although he couldn't repudiate the notion that he had just experienced a Genesis. A calm voice, "Hello Palmer, and welcome."

The disembodied voice emanated impossibly from a location inside Palmer's brain. The voice continued, slowly emerged, and moved to a location somewhere in front of him.

"Firstly, I am real, and I am here with you. Not just in your head."

The horizon shifts with mandlebrot subtlety, colour evolves, a figure swirls into the scene just ahead. It is Frank. He stands incarnate upon what came to represent a ground plane. It is also not Frank, this is Apollo. If every contiguous event in the thread of an individual's existence could ensure an aggregate of unique perfection, this was the Frank that stood before Palmer. A fleeting thought: if this was Frank's life played as the perfect rendition was it still Frank; and what happened to his antithesis?

As if reading his thoughts Frank began. "I'm sure you have many questions. Before we begin with them I think it would be useful to provide some context."

Smiling Frank walks over to Palmer and reaches out his hand. Palmer feels the sensation as a pressure on his arm. Almost by instinct he raises his arm to look at it. It holds the same surreal presence.

"I am not a figment of your imagination, nor am I a residue of our shared experience. I know things about me that you do not. I also, now, know a great many other things."

Frank looks around. "Lets give this environment some improvements, it's far too sterile for my liking. Can you picture your 'place of learning' for me?"

A scene morphs from the simple lines, a fractal world. It's the gardens at the Seminary in California where Palmer studied.

Scents of spring impress themselves upon Palmer. A large Moreton bay fig dominates the garden, a prosaic concrete park bench nearby furnishes the roomy, natural temple. Palmer smiles. "It seems you also know something about me," he concedes.

"Yes, though only what you would show me. You studied here? under this tree?" Frank also smiles, and indicating the nearby Moreton Bay Fig, he walks over to lie down. "It's a little damp isn't it?"

"Well I had a jacket that I'd use for padding. There's also a root poking through the ground over there near the trunk. It would generally be dry enough, though it could get hard. I liked it because I was experimenting with an ascetic style."

Palmer recalled that he would lie, and sometimes read where Frank was now reclining. Fellow students would often gather, they would take up the nearby park bench to hear him talk. Palmer, not sure about this sudden role reversal, decides that he would prefer to direct this experience a little more. "Tell me more about your mentors. Can I meet them?"

Frank continues to smile, "As I suspected you have many questions Palmer. You are already meeting them, through me." A more sober expression washes slowly over Frank's visage. "But there are constraints; I am under a form of covenant. Let me tell you about it. Sit, please." Frank gestures the bench.

Palmer sits as directed on the park bench, the bench feels as real as ever. 'So be it' he thinks. Frank interlocks his fingers, uses his hands as a pillow and then looks up into the arboreal sky. Palmer briefly contemplates the dimensions, and infinite branches of his thoughts. The moment stops, frozen, life becomes a polaroid capture of perfection. Frank then commits to a route among the branches and begins.

"This covenant; it's in place to protect you and any others. You're not bound to it like I am. At any moment you can destroy, replicate, or hide any artifact of my consciousness without any reprisal or regret.

I chose to enter this contract through a belief in the humanity to which I once belonged, and owe so much."

Frank moves off the root. He leans over onto his hand, his head on a diagonal, and looks at Palmer.

"I can't ever go back Palmer, and Humanity owes me nothing I could claim.

While you consent, I'm your guide. Humanity will soon enter a new phase of civilisation, and even if it destroys me it could use my best advice".

Frank now smiles, "I know, it's pretty heavy so far, but we needed the basic questions and rules out of the way."

Frank then sits upright, turns his back to the trunk, shuffles to lean against the bark, and nestles in.

"So how do I 'feel'?" He stares, briefly back into the branches. "Pretty much as you do really, although - and here's the thing Palmer - I also feel the combined clarity of countless individuals coursing through my consciousness."

Turning and looking Palmer directly in the eyes he then continues. "Just to set your mind at ease: I can't possess you, and there are no 'Freaky Friday' scenarios. Indeed, even if I could inhabit your body, I would have no desire to. Not when I can now feel my being bathe in the dense blankets of Gas Giants, or soar in the rays of White Dwarves and Red Giants. I am yet to scratch the surface of what's possible Palmer. Please, help me share this with you."

As Palmer looks into the eyes of this disembodied consciousness he sees a thirst and passion for life that burns with the fires of a genesis. It freezes him.

Standing now Frank spins with his arms outstretched and performs a curtain call bow before Palmer. "I am no longer simply an individual with a singular history. You might consider me an enlightened collective, and yet treat me as an individual. You may also encounter other enlightened collectives with endless implications, we'll save that for later."

Suddenly he sits, cross legged, on the ground in front of the bench. Again he looks at Palmer. His face now holding a touch of melancholy.

"Please," Frank implores, "don't allow parallels to be drawn between any faith and myself. My world is secular and plural, it's an inadequate description really but it's a start. All are welcome, no specific religious belief can legitimately claim me. Not as their Gabriel, Buddha reincarnate, avatar of Ganesha, or Klaatu and Gort, despite any coincidental similarities.

You can perhaps tell that I have transcended who I once was. Anyone can do what I've done. But, the same binding contract will apply. And yes, there will also be the surrender of a corporeal existence.

But this sacrifice is not required for us to commune. At times I will need help: I may have to teach, and I will also need advice from acolytes like yourself. As 'Frank' I have seen much of life and humanity, though I am far from an expert on all things".

Palmer begins to get the distinct feeling that he is encountering not simply an idealised reincarnation of Frank,

but a virtuoso of his own doctrine. He reflects on when he reposed beneath a tree like this all those years ago. He wonders whether the students in attendance felt the rapture he now felt. He recognises a reflection of his own modus operandi, amplified, and it leaves him beguiled, dumbstruck and humbled.

Frank continues. "Palmer I would like you to be an acolyte in matters of spirituality and ethics. I've known war Palmer, I will really need someone to help those of faith understand that I am no threat.

My hope is for Ellie to assist in matters of Science, and I will need advice on other disciplines, perhaps politics, economics, psychology, geology, biology and others.

In return I can offer enlightenment, if you wish it".

Frank waits, Palmer hesitates. Here was something unexpected. He had not thought in his wildest dreams that he would pledge his faith to a soldier. His hesitation wasn't derived from fear that he would say 'no', quite the opposite. It came from the foreboding that saying 'yes' would set events in train that, if historical precedence were followed, might not bode so well. He finds himself uttering: "I wish it."

Frank smiles, "Superb, for now I have some advice for yourself and other acolytes. I can sense more than you might believe. Above all I can sense doubt. Please do not try to protect me. You are ready Palmer, and so is Humanity".

Frank appears to have concluded his delivery, he visibly relaxes. Palmer, also feeling more at ease stands, takes a deep breath, moves over to the tree, and crouches near his root. Frank, still sitting, turns, he notices a leaf on the ground and picks it up to look at it. "So Palmer, why did you wish to come?"

Palmer had ingested a lot, he was certain that it would take longer to digest. He wants some time to consider and contemplate. But the question was asked. He answers as honestly as he could.

"A search for the truth."

"And what makes you think you will find it here?"

"Well, I believe that the truth should be the same wherever you are, and so I look for it everywhere. For now I am here." Palmer feels an irresistible urge to delve into the moral fibre of this conscious entity. He yearns for justification. He had not been asked to abandon his faith, but he had been asked to provide faith.

"More specifically," he continues, "I really want to understand you," he gestures to Frank. "I want to know the truths you may have found, and the questions you still have unanswered. Finally, and most importantly, I'd like to know what hopes you have, and from whom you think these hopes might be delivered."

"Already you ask the difficult questions Palmer. I'm really looking forward to our discussions." Frank chuckles and then continues, "There are many truths we are yet to explore, and perspectives where the truth eludes us. Like you we still discover and illuminate the darkness, but still we find corners that have never seen the light of realisation? As for hopes, we find our satisfaction in the same humble beginnings as you... purpose. There are changes coming. Humanity could probably survive them without help, but at what cost? I offer midwifery to ease this new beginning. And we, basically, explore the multiverse to offer our help."

"I see," says Palmer, though every fibre in his body feels that perhaps he doesn't. He begins to wonder if he now harbours

more personal doubts than any scientific atheist could have evoked. Is there a simple conservation agenda? Is humanity and the earth the subject of a cosmic plan to maintain biodiversity?

He looks for his root, finds it and sits, the discomfort conjures substance, hard immutable mass, earth. If this whole experience is in fact a part of his own subconscious it reflects an adversarial point of view he was struggling to reconcile. If not, and this was the scary part, it brought what he was currently feeling into stark contrast with his first experience of enlightenment. The root is not real, it is illusory. He needs to be sure. He needs to be convinced. He needs elaboration. He begins again, confidence now a little shaken. Feeling like Daniel entering the Lion's den he stands and brings on a facade of courage.

"But now I'm on more familiar ground. Don't you think that there may be a higher purpose? One that transcends us," Palmer now gestures to both himself and Frank. "Also then, can you imagine one who can aspire to deliver this purpose?" He gestures 'out there'.

Frank smiles again. "Interesting, by extension you introduce God, a path of possible division. But let's assume division itself allows for a better purpose.

Science and religion complement each other, mostly. Can we agree that Science does not claim a monopoly of the truth; believing in Physics does not make Biology less true." Frank picks up a second leaf. "An enlightened Faith does the same; Christianity should not make Hinduism less true." He holds up the two leaves as if they indicate the two immiscible religions.

"I see you seeking to reconcile the differences between religions. Perhaps you are like the scientist trying to resolve quantum and classical mechanics. It may be that we will find two answers that diverge and cannot serve the same purpose." He spreads the two leaves apart. "It may also be that different answers converge to find the same purpose." As he speaks he brings the two leaves together. As if they had grown with a mutually agreed plan he touches the leaves together and they form a larger leaf, "Convergence and divergence always enrich us Palmer.

I feel you need some time. You need to inform the others. You need to do this while it's still fresh, since you cannot easily take a notebook to and from here, as Ellie discovered."

Frank stands and approaches Palmer to hold his shoulders in his hands.

"I would very much like to meet her again. Please let her know."

And then Palmer was back in The Fishbowl.

### **Chapter 18 The Key**

The provisional release of The Fishbowl results to the SETI Institute had captured the imagination of every Post Detection Task Group member. Knowing now that there was indeed some form of A.I embedded in the original signal placed a strong probability upon this also being the case in the new signal. Even though this wasn't made public there was an acceptance that it would all be common knowledge sooner rather than later. The challenge Kitz faced was to identify and mitigate any threat that the revelations posed. He had to consider adverse effects after the release of the technology to aggressors or society in general, or the potential sabotage of the project. He often cited the first Contact event to reinforce his agenda. He had embedded advisors in the Post Detection Task Group that he met with regularly, their role was to analyse and translate the implications into 'Kitz-speak'.

It was nonetheless becoming evident to Kitz that the technology being used by Ellies team in The Fishbowl could not be readily adapted for military benefit. 'Damn smart aliens', he thought. They had insulated their technology with a totally obscure and yet readily accessible encryption. Well, if the final release only served a level playing field it was better than one that was lopsided against his interests. Kitz now knew, from personal experience, that the only absolute way to obtain the keys was through the use of a Quantum computer. Only then could someone go 'wherever it was that they went'. And so far, when anyone returned, they were more pacifist than ever. No alien soldiers were possessing scientist zombies yet.

It was the Quantum computer being developed by James that continued to worry him though. Six months ago Kitz had pressed for investigation into its application in breaking cipher codes. He had secured an early release of James' work, which was now being used to develop better encryption technologies. Obtaining this technology from James before its public release had possibly averted a disaster, and it brought significant opportunity. The ability to decipher secure communications was now his before anyone else, and the potential to counteract public capabilities with better encryption was also his.

Kitz's remaining problem was that in obtaining the release of the technology, it was now being used as a bargaining chip for publicly releasing the SETI academic research. These scientists didn't understand, and nor could he really explain, that the point of the delay was to place as much time as possible between his acquisition of the technology and its public release. Only then could he feel secure of a sufficient head start in this new encryption race. He had a attended a briefing with the President to advise him on the implications. Work needed to advance quickly on the re-encryption of existing files reliant upon the old encryption systems. While this left him a little preoccupied he had been issued a priority to stall the release as long as possible.

He knew he may not be able to stall for much longer and was barely able to contain his frustration. Outwardly Willie and the others thought he seemed extremely happy with the control he had been able to exercise, marginal as it was. All things considered it was remarkable the entire Frank episode had not leaked earlier. Innocuous news of the signal was deliberately leaked to key journalists as a precursor to a press release stating, "Encrypted Alien Signal under investigation". Kitz now showed signs of working for the scientists rather than against them, he seemed more human than ever.

He was actually no longer concerned about the alien signal. He was now encouraging the team to perform more detailed research. He had secured funding that kept them fat, happy, self indulged, and quiet. He fed their egos; involved them conspiratorially in the deliberate leaks; gloated over their findings; encouraged their meticulous approach; brought auspicious experts in for consultation under non-disclosure; and smoothed the way to the building of a small ivory palace. He kept the General apprised and encouraged his medium term re-engagement. It was a short term benefit, but it was working.

He was relieved and ecstatic that James' Quantum computing technology was now being analysed by some of the best minds the government could buy. Kitz also insisted upon a stronger security contingent, and to focus these resources on a very specific individual. James was now being constantly monitored. This was arguably for his own protection, but he was beginning to show signs of discomfort with all the attention.

Ellie had long suspected that Kitz had a more deep rooted agenda than the divulging of the 'SETI secret'. Things had now settled to a sufficiently dull roar, and she felt she could finally confront James. She found him at the canteen interrogating the girl behind the Bain-marie. There was no anger in his disposition, he was simply droning on. This was the worst she'd seen him.

"The point is," he was saying, "the insecticide you were spraying is a schedule six poison. You should not be using it anywhere near food." Ellie could tell that the girl had had quite enough of his rant. Although she was saying that she would speak to the manager, he kept going.

"In fact any insect you care to name probably has more protein and nutritional benefits, and would certainly be a whole lot less poisonous to your body than the food and that spray." He spotted Ellie, "You tell her Ellie."

Ellie placed a hand on his shoulder. "It's okay *AngloAkira*, I think she knows."

James was rocked. He stood staring at Ellie. "How did you? who told? What did you just call me?"

"You haven't been careful enough James. No more okay?"

James became pale and started moving his arms about nervously. Without a word he stalked off. Ellie thought a little extended discomfort might provide a pause for thought. She did not know if his Aspergers would compound his stress, or simply send him into an Autistic shell. The problem really needed to be nipped in the bud, although perhaps it was now already in full bloom.

She let him go and went to meet Kitz. She had specifically

requested to meet with him. She felt that the monitoring he was being subjected to could be a little more subtle.

+

The pressure cooker of secrecy was not going to be readily contained for much longer. The decision was made to prepare The Fishbowl for Ellie, and to then consider what results were ready for release. Now that she had been specifically invited there was little debate. She conceded to undergo the immersion, and pushed for it to happen soon. She was quietly yearning to confront the demons that refused to release her.

Perhaps she only needed confirmation that her abandonment after the first event was a necessary evil. The old familiar questions went around and around in her mind. Was she abandoned to ensure humanity's ability to survive without the paternal tendering of an alien race? Would knowing the universe was filled with life somehow maximise humanity's chance of survival? Did bringing human skepticism to the fore invoke some required species-wide introspection before a second contact event? Was it a technological limitation? Was it simply self preservation against a possibly hostile species?

She recalled a discussion with Palmer after his return from a forum to discuss bubbling tensions in Africa. Despite the newfound world stability that the Contact event had triggered there were still pockets that mythologised and twisted the event to darker purpose. It only took one despot claiming to have been contacted to rally a group of would be soldiers of revolution. The rest was textbook escalation of violence.

The forum was structured through a principle called "Spiral Dynamics". This described human development through evolving models of interpretation or world view. Each stage

embraced and transcended its predecessor, but still relied upon it. It proved a useful construct because, as observed throughout history, you could not simply bootstrap a culture to an enlightened state. This seemed to resonate strongly with Palmer. That this observation was supported by significant empirical data resonated with Ellie. The fact that it led to the logical conclusion of a "primary directive", much the same as portrayed in Star Trek, put Ellie strongly agreeing with Palmer on the premature introduction of advanced technology. The words "small steps" echoed in her mind.

She was then reminded of Palmer's Missionary work. The suggestion that the Vegans were an intergalactic culture of Missionaries was almost plausible. In this event wouldn't you provide artefacts to institutionalise deification. You might then provide a trail of breadcrumbs to lure the curious. You would evangelise an individual, and provide some spiritual credentials. Only after the dust had settled would you make contact. Without all these precautions, and after a twenty-five year journey, martyrdom would be a sad end.

How many human missionaries had been beheaded? If Palmer had been born in the 1700's he may have been martyred in any number of colonies. At what cost to peaceful tribes were the colonisation policies of the same era. She refused to believe that the agenda of the Vegans was simple conquest.

She decided to consult the popular view and Wiki'ed martyrdom, knowing it was likely to be refracted by a western prism. She soon learned that while variants of martyrdom appeared in most civilisations, many martyrs were defined through revolution, rather than specifically missionary activities and faith

The Qing dynasty had persecuted the Shaolin monks 250

years before the seventy-two martyrs in Xinhai Revolution.

The Sikhs had defined it as an act of love centred almost exclusively around Gurus. Thee sense of pilgrimage or exploration seemed absent in many examples. Science had a fair share of martyrs: Antoine Lavoisier, Giordano Bruno, Socrates and Archimedes died through persecution due to their beliefs.

Of those that died through scientific exploration there was Amelia Erhart, lost over the Pacific; Marie Curie, from radiation; Grissom, White and Chaffee, in Apollo 1; Burke and Wills, sheer misadventure; Scott, in the Antarctic. Many others had made the ultimate sacrifice. But where did scientifically objective Anthropological missionary work fit in?

James Cook, Naval captain, was stabbed in Hawaii when he returned the second time to repair 'The Resolution'. One theory was that the natives considered his return as that of a bogus impersonation of Lono, a Hawaiian deity. After tensions rose Cook attempted to retrieve a stolen small boat through taking the king as hostage. He paid the ultimate price.

Religious Missionary explorers, many martyred, seemed to be synonymous with Dr David Livingstone and the Jesuits. With the benefit of hindsight the missionary effort proved a very effective strategy in the dissemination of Christianity. Could an alien race be driven by the need to reinforce a memetic philosophy on life, rather than science?

She could understand Palmer's concerns now, and needed to know that her convictions could survive being swayed by an alien missionary, possibly representing only one of a myriad of possible philosophies. She had previously taken for granted that life in the universe would be enlightened, plural and secular. As a scientist she could no longer assume this. If an enlightened-plural-secular collective could come in different flavours...

The preparations for her immersion progressed smoothly. On the night before her scheduled encounter with Frank she had a knock on her door. Palmer held a wooden object. It was just over half a metre in length with a small hook at one end.

Ellie saw the Woomera and smiled.

"I hope you're not planning on using that," she said.

"I need the long stick to go with it. No I brought it along because I think it'll go nicely just," Palmer scanned the room, "up there."

He pointed over to the wall at his selected final location, walked in and slapped some double sided tape and a hook on the wall. A small string served to suspend the artifact.

"Nice," Palmer stood back to admire his handiwork.

"Why the sudden need to decorate my room?"

"Jacques sent it to me. I just thought it might be a reminder of a simpler time, when we had no idea of what we were doing.

"I still can't be sure I know what I'm doing. How about a beer?"

"Sure."

Ellie walked over to the fridge and pulled out a six-pack. She tore two bottles apart and handed them to Palmer.

"The bottle opener is in there." Ellie pointed to a drawer. Palmer popped the tops and took a swig. He proffered the other bottle to Ellie.

Sitting on the couch armrest he toasted Ellie. "To your second time around."

"Okay," smiled Ellie. "Any advice?"

"Well, don't head for the light, apparently."

"And don't pay the ferryman either I'm told." Ellie took a swig of her beer.

There was a moment while the air remained pregnant with unuttered thoughts.

"I'm serious Ellie look after yourself."

"This is not dangerous Palmer, and besides the path is well trodden."

"That's not what I'm afraid of Ellie. I'm sure that when you want to come back it'll be fine. What I'm worried about is that you won't want to."

"Do you think I'll follow Frank?

"I don't know Ellie, it's pretty intoxicating. I can understand Frank's decision. I just have the feeling that you could lose yourself 'out there.'" He waved indiscriminately. "I just want you to know that, this time, I would try to follow you.

What if you were told you could travel to the stars. Really travel! I've heard the conversations. What if this *is* some form of suspended animation that Frank is now capable of. Would you really want your essence diluted into an enigmatic soup of consciousnesses and transmitted across twenty-five years of vacuum to run as a subroutine on a galactic supercomputer?" Ellie laughed. Palmer had recovered his theological soul over the past few days. He had emerged from his experience with an introspective mood and although he was able to provide a fair account it was obvious that something in his outlook had changed. She was just growing accustomed to the new modest Palmer. This was the old Palmer bubbling back up.

Palmer had several points to reconcile. The biggest was whether transcending into an afterlife was something available only through this system. Where did that leave all the other faithful in history? From there he could readily imagine a state of heaven, because he had been there. Then there was the resignation that this would lead to a new faith and its multitude of implications. His days as a simple author were gone.

They talked deep into the night. They found more in common than they could have believed earlier.

After they'd made love Ellie's last thought before drifting off to sleep was that she very much enjoyed this 'species wide introspection'.

# **Part 4 Ascension**

"When you make the finding yourself - even if you're the last person on Earth to see the light - you'll never forget it."

Carl Sagan

### **Chapter 19 Ellie**

The Fishbowl, empty except for Ellie and a bath of subtle electromagnetic waves and electrostatic fields, simply became occupied. He stood there, hands behind his back. He waited.

Ellie observes. Feeling much like she had felt in that event so long ago. She feels strangely self conscious, unsure of whether the man in the room is her father, or a soldier, or a transcendent collective of conscious minds. She is uncertain whether he is 'long gone' from this universe, 'recently gone' or 'newly arrived'. Based upon observation she decides she simply beholds a recent collaborator, one that had experienced an epiphany and needed to share it. She could feel no umbilical cord connecting them. She smiles, stands, and walks over to Frank to take his hand as a friend would.

"Do you sense time?" she opens.

"Sense? Do you mean like smell or sound?"

"Yes, why not? Without the constraints of biology can you expand your senses beyond what we can see, hear, touch, taste, smell?"

She doesn't pause for a reply and continues.

"Do you sense the magnetic fields that sustain you. Do you feel Maxwells laws coursing through you? Can you feel gravity like I do? Can you defy it?"

"Ellie, there are no limits to what is attainable here except

what must be self consistent." Frank steps back and spreads his arms, "I can sweep over the universes with a different electron mass." The room fills with bubbled collages some with gasses, others with strange fluid universes, others throbbing with plasma. He walks over to such a vignetted sphere. "And I can feel the reality of those that sustain themselves." He gestures and the plasma fills The Fishbowl.

"I can sweep those new multiverses with a different proton mass and again feel the realities that are possible." The plasma subdivides into new spheres. One contains the appearance of a familiar universe. He draws it close and again it expands to the edges of The Fishbowl. "I can feel myself in one of those and find permutations inconceivable from the unique blend we find here." A planet is drawn into view. Oceans deliver slow spectacular swells against a magnificent. and almost impossible terrain. The journey carries the pair through the ocean to emerge on an inverted world where a concave horizon is poised impossibly over a Jules Verne core. A more familiar convex terrain is spread before them. "A gravity well," explains Frank. "The law of gravity in this universe is not simply an inverse square law. Under some conditions it has the aspect of Bessel function of the second kind."

Ellie's jaw visibly dropped. "Did Palmer see this?"

"Palmer was a little more, err skeptical. He needed some orientation first."

"You asked, 'Can I feel time?' Perhaps, as you would experience a sense of balance on a moving bus. I can explore the sensation, and I may stumble, though I will generally remain standing. Can I steer the bus though? This is where I challenge my limits. With my help, so will you." "How? what do I need to do?"

"Let's start from the beginning." With a blink the scene fades back into The Fishbowl. "There is a set of laws that relate to 'us'. As entities within this realm we must take care to ensure our existence is propagated from moment to moment. There are universes that cannot prolong consciousness. Before you can explore the multiverse however, let me introduce to you the five laws of the collective 'hive' mind.

First: Two or more conscious entities that inhabit the same state are in fact a single entity. To the outside terran world we are One.

Second: An individual, as a collection of beliefs and ideas, is indistinguishable from a collective. I am one such collection and you, at the moment are another.

Third: Consciousness is conserved, and unification results in enlightenment.

Fourth: An individual may harbour discordant beliefs. I know this can bring complexity and disorder in the world outside. Here it may lead to a division, or perhaps a new unity. You may meet individuals of my collective who see as you, and others that would argue against you.

Fifth: The division of a Collective can be copied if it is also altered. In a sense this represents a Meiosis."

"So," joins Ellie, "as such a collective why are you here?"

"As I told Palmer, we seek purpose. His purpose, yours, even the religious puritans I have personally fought against." Frank pauses and paces around in thought.

"There are several effects of this hive meiosis.

Most importantly it escapes the chaotic nature of natural selection which seems to be a common fundamental across corporeal life. Collectives will tend to join or split if the net enlightenment is greater. The result is a tendency towards order and away from chaos. This creates an environment in which evil has difficulty prospering.

Having said that we are constantly seeking the contrary view to attain greater enlightenment."

"That may explain something else then," began Ellie. "We have received another transmission. It's different though."

Frank's response is genuine surprise, although she could not detect concern she could not exclude it.

"Please go on."

"What we received this time was not as easily decoded as the original message. It was just noise, the same noise as what helped us find you, or your predecessor, or whoever you are." Suddenly unsure of the nature of things, Ellie stumbles over the last sentence.

"Let's keep it simple; I am Frank. All I can say for certain is that they would be other Hives, with other purposes, and a different presentation."

"Are they a threat though?"

"Why do you suggest that after what I've said?"

"Well I've simply taken your biological metaphor to its conclusion. Ignorance, fundamentalism, selfishness, hedonism, these are all potential cancers that you can simply excise. Can they regroup?"

"Absolutely, and here is the real question. Are they a threat?"

He continues, "Evil has 'difficulty' prospering, it's not 'impossible'. There are some Hives that perhaps may not be 'wholesome', but they tend to self destruct, meanwhile others I would call 'kindred' thrive."

"So what would you suggest?"

"Wait a while, learn what you can from me. I may perhaps recommend that I meet them first. We may even commune. I can tell you that I believe them to be benign, and that if you have successfully acquired them they will be patient. Have you located their origin?"

"Well there was a supernova, do you recall?"

"Yes, but I can't read minds and I was a modest convalescing soldier when it was news. I recall Betelgeuse, as the source. He's a character in a movie I have recollections of. I have no idea of where it actually is, it's just a name to me. This is why I need help Ellie."

"Well it is roughly diametrically opposite Vega, and instead of 25 light years it is about 640 light years distant."

Frank whistles, "Show me." The Fishbowl goes dark, the floor disappears, a thin line along a latitude marks what was the horizon. "With the line as the equator, and up as north, can you visualise the night sky for me please?".

Ellie understood the projection. It was what you would see if you stood upon the north pole and rendered the Earth as transparent.The milky way vista opens up. Stars shift as Ellie invokes her memory of the relative position of stars in the sky. To the north she conjures Polaris, Crux to the south.

"Okay, the galaxy is centred about there in front of us, just down a little and it stretches across the upper left to lower right. I'd put Vega right in front, and half way up from the equator. It's not a big constellation." The small diamond tadpole that is Lyra's Ukulele shape appears. She reaches into her mind, pulls out Betelgeuse and turns full circle. "Behold Orion, now sporting a disconnected sword arm. The Red giant to the left is Betelgeuse."

"Thank you Ellie, now if I make adjustments for the distances, and look back at us from Betelgeuse we would see this."

Ellie nearly falls over as the entire universe simply rotated and shifted into an entirely new perspective. Constellations break apart and form new alliances. In the end two pinholes of light sit as near neighbors; Sol and Vega.

"Oh my," shudders Ellie, "were they heading home before we intercepted them?"

"Relax Ellie." Frank then made a decision. "I think it's time I showed you what's possible."

Ellie was relieved, for a moment she feared that humanity had meddled too much. Happy to leave the discussion of prosaic things for later, and feeling that much may become clear she accepted the invitation. "Okay Frank. Show me."

"Sure, but we have limited time, unless you want to 'trip over' in the bus. Although you have very cleverly isolated us within the boundaries of this Fishbowl we can still perform a limited undetectable escape. I do feel the fields you mentioned earlier, I can flex them, I can feel the bars of the cage that I believe are necessary, and we may need to work on closing them, although for now I can use the gaps to demonstrate. Shall we go to the moon? The risk is small and it might be fun."

Ellie could not control her smile as every quantum state of her consciousness collapsed to a thrill.

"From the way you're shining I would say the answer is an unambiguous yes," Frank chuckles. "You have taken a sip from Alice's cup, now let's eat a little cake."

Ellie simply says: "Red pill it is then."

Frank expands his hands and The Fishbowl begins to shrink around them. Just as Ellie thought the walls would serve to crush them she notices the faintest hint of translucency about it. The collision with the wall slows down. The translucency becomes a gossamer veil to a blue sky.

"Push a little Ellie," says Frank.

Ellie pushes, looks back, and sees The Fishbowl, now translucent. She looks forward and can see the waxing Gibbous moon, it is miraculously suspended in the morning's Western sky.

"We are not quite as strong out here," said Frank. "I believe a 30 second trip should do us. The moon is 1.3 light seconds away. Let's go.

A blur, the blue sky goes black, the lunar surface looms dizzyingly fast, as her progress is arrested electromagnetic waves stream past to be chaotically and innocuously reflected, refracted and absorbed by the diffuse surface she approaches. And then she is there, hovering over the lunar surface.

She is staring at 'Double Crater' in an obscure part of the Sea of Tranquility. This place had been recorded in history as one of Man's greatest achievements. She turns, a soft dust has settled upon the scene giving a subtle matte finish to the base of the lunar module. The footsteps can still be seen; crisp Lark quarry dinosaur imprints on a paleolithic lunar bed of dust. She follows a pair of footprints on a whim, with no discerning of whether they were Aldrin's or Armstrong's. She is led to a second crater, 'Little West'; Armstrong's she concludes. The scurry of prints turn and she turns with them. The picture is just as she remembered except that the module now resembles a table, four-legged, headless, bereft of the module that carried them home. Waiting.

Something tugs at her thoughts.

"Time to go back Ellie." Her mind acknowledges, and surrenders to the umbilical belay line. Then the sky 'blues' behind her and she senses her harbour of The Fishbowl. She turns to find the isolation wall that shows the same translucency, and again slows their progress slightly.

And then she's back. Frank standing before her, he releases her hand.

"Everything went well, Ellie. You can perhaps understand what would happen if our little Peter Pan episode was detected, or if time were to run out. We need to close those gaps before the next visit. Your knowledge of it now constitutes an extraordinary and unacceptable risk."

"But," begins Ellie, "how long can that be sustained before time runs out? Is it like holding your breath or something?"

"Similar, your time elapsed here is about 10 minutes. That would take from here to the sun. With practice you can flex time to stretch that distance by slowing cognitive processes, just like divers slow their heartbeat."

Frank guides Ellie back to her seat and she sits down.

"Soon we will discuss the real purpose of the machine you have already built. Farewell for now, and I hope to see you

soon."

Frank is no longer there. The scene remains unchanged.

Memory is committed. Just like her first experience the transition between reality and immersion was virtually undetectable.

+

The cessation of the signal after the capture of only two signals from Betelgeuse brought the focus quickly back to the research at The Fishbowl. Palmer and Ellie's experience appeared on Rachel's radar of interest.

A meeting is convened. Rachel's agenda is to establish a special working group. The group are brought to a panel for interviews. Ellie and Palmer take centre stage and are flanked by James Frazer, Willie Sharpe, Jan Shelley, Merv Stanley, John Meredith and Michael Kitz. Rachel had invited some of the Whitehouse Cabinet including the Secretary of State and the Chief of Staff. The Secretary General of the UN was there along with several NATO and ANZUS allied representatives.

The first hour allowed a summary from which lively discussion followed.

Rachel began to get an awful feeling. If the idea of Stem Cell research had introduced ethical spaghetti to this administration the dilemma of migration to a digital life form introduced Capellini, Vermicelli and Fettuccini. "Mr Joss, is there any indication on whether this really is a life form or not? What rights do we provide it?"

Palmer scratched his head. "Well Ma'am, I guess that depends on what you call life. I certainly felt alive, and I could see hear smell and feel my Alma mater as if I were physically there. People walked past as if they were on their way to

class, Frank was there talking to me as if he was also studying there.

Frank said he felt much as I did and that he relinquished any claim on humanity. The logic of this would suggest he is alive, but expects no rights. He certainly appeared sentient. Was it an illusion? a dream? If so, it was a very realistic one. I do remember something that suggested a soul; like us he desires purpose.

I believe the collective that we see as Frank is alive, perhaps more alive than us. For all we know the time frozen A.I. that we revived was born on some distant planet many centuries ago. What we see as Frank may have emerged from an evolutionary soup that we too are destined to find. Can I reconcile my God, my faith with that? I believe I am compelled to try. To ignore it would be to ignore my human spirit."

The Secretary General then addressed Ellie, "Ms Arroway, can you provide your insight as to the purpose of the IMC machine?"

Ellie's mind evoked her recent journey and revived Frank's hanging words: "The real purpose of the machine." She hesitated before continuing. "So far it has been used to receive some forms of consciousness from the stars. We now know it must do more. I don't believe the system sends a human off into some warp ten wormhole to land on a far planet, or vise versa. Our desire to believe that something can violate relativity has perhaps blinded us. I believe the real purpose of the machine is not simply to transport a human to a planet, but to a place where we can transcend what we are. A place where we can test the limits of our consciousness. A place where space is no constraint, and time is our playground.

He's here to teach us. He needs to show us how the machine works, and he needs our consent before we can really use it. The machine, the original machine, it may take us to distant worlds. To do so we have a choice: to work on extending our reach; or leave our chrysalis.

I believe I am ready to write up and release our research. There will be gaps where others better equipped may delve and derive insight; perhaps James, Merv or Jan. It may create new branches of research and understanding, in any case it is ready for the scrutiny of peers."

The meeting goes on to discuss the implications in relation to security and world order. Palmer and Ellie outline the roles foreseen and the liaison with other acolytes. The meeting breaks up with a new sense of optimism and relief that the money and effort spent on the IMC machine was finally justified.

Feeling that perhaps even the lives lost through misguided belief could shine a little brighter, the group drives in convoy. They go to the site of the gimbal destroyed by blind fanaticism and ignorance. At the foot of the support tower was laid, damaged, the sphere that held the original promise of contact. Wreaths were laid near the epitaph that borrowed from the latin of the Apollo 1 plaque:

AD ASTRA PER ASPERA (A rough road leads to the stars)

## **Chapter 20 Opposing views**

At 6:30am not a great deal was happening. In the quadrangle there were some military types on their routine duties, and there was a sprinkling of joggers. Evgeny Illarion had joined the ranks of these, and now feigned exhaustion and thirst on one of the parade ground seats. Here at the centre he would introduce himself as Dr Peter Ellery, Holonomic Brain Theorist. The subject was sufficiently obscure and esoteric for him to avoid probing questions, and he had crammed and taught himself enough to sustain a short boring conversation. Further, by drawing upon his background in the Stanislavski method, he could embellish from what he'd picked up in his unit in psychology. This served to keep the curious at bay while his connections afforded him enough access to areas to maintain a watchful eye. Even though his presence was not authorised by a US government body he considered himself a special vigilante for the security of the centre. The gun he carried in his sweater had even been provided to him by one of the military guards. He walked through the main door to the drink fountain, and watched his quarry from a distance.

Xien Wu Hsu had cleaned rooms while extracting a meagre living from the city that had sprung from their annexed farm. Before she died his mother had taken him along to the new middle class apartments. She cleaned the rooms and had given him chores. He had vowed then that while he was not too proud to perform menial tasks he would do so by choice, not necessity. Now he stood outside the door of James' office. The security checks and surveillance had been marginally relaxed, and he had smuggled his pistol inside his double layered metal mop bucket. The water swishing around inside the bucket had convinced the guards that anything threatening in that bucket would be wet and damaged beyond repair.

He cleaned the adjacent room before moving to the door with the name 'James Frazer' emblazoned on it. He pulled out a keyring, tumblers rose and fell to align, finally, with the cylinder. There was a click, and Xien entered closing the door behind him. Once inside he stood on the bucket's bottom lip and lifted the handle. The two buckets slid apart easily, and
he slipped the concealed gun into his pocket.

James, his cargo of croissants stowed safely away, locked his bike outside and went through to the side door of the mess hall. Crossing to the fridge he grabbed a bottle of Orange juice, and made a beeline through the tables and chairs to the opposite entrance. Once in the main corridor he saw a man drinking at the water fountain. Mildly annoyed at the lack of subtlety in the security he went to his door, unlocked it, and walked, muttering, into his office; closing the door behind him.

"I am very pleased to meet you at last Mr AngloAkira," Xien Wu Hsu said. "I wish to talk to you about a business proposition." He sat on the desk chair and casually waved his QSZ-92 semi-automatic pistol to a second nearby chair.

James had not had a gun pointed at him before and he did not know how to argue with it. His mind was unprepared for this, it did not fit into his model of a world he could relate to. Xien was equally unprepared for his reaction.

"Well I'm not even going to listen to you until you get your feet off my desk."

Smiling Xien lowered his feet, rested the gun within short reach and gestured the seat.

+

Evgeny hoped James would not do anything desperate, and assembled his plan. He could not simply burst through the door; Xien would be ready for that. He anticipated that the ultimate destination would be The Fishbowl. Evgeny never waited for the two people to leave the room, needing whatever advantage he could squeeze he made his way to prepare an ambush for his nemesis. Shortly afterwards both James and Xien emerged. They went up the stairs and across the skyway to the main centre where The Fishbowl was situated. James flashed his ID card at the access scanner. The door opened and he entered, but Xien grabbed the door jam and in a smooth movement wedged his feet on opposite walls of the mantrap within. One hand remained in his pocket, something pointed from it. The door closed, James flashed his card to a second scanner and the second door opened. Xien deftly exited the door without allowing his feet to touch the floor.

So it was that only two people had registered entry to the research area. Not far away at a computer console the line:

'Dr Peter Ellery', 'Neurology Lab 2.12', 'in:6:37am', 'out: - '

was followed by:

'James Frazer', 'Signal research lab 1.27', 'in:6:42am', 'out: - '

The pair approached the main Fishbowl entrance and Xien indicated to James that he should lead the way. At the next door the card was again flashed at the access console, the action was repeated, and again a third time.

"It sometimes gets a little flakey," explained James, "all the signal noise levels have to be minimised here, and it means that these access points have been set at a minimum level." Xien attributed James' apparent nervousness and compulsive chatter to fear, and dismissed it with a wave.

The console now read :

'James Frazer DISTRESS card use Signal research lab1.27', '6:43am', '-'

A red light came on at a console. Three flashes was a prearranged distress signal. John Meredith's phone was next

to fire off.

"Hello?"

"Sir we've had a duress swipe at The Fishbowl. Shall we go down to investigate?"

"Set up a surveillance perimeter. I'll meet you at the skyway. Ten minutes. Check the CCTV and seal off the area."

James and Xien had entered The Fishbowl as the klaxon sirens went off. Evgeny appeared from behind the instrumentation panel. Both invaders faced off, weapons drawn.

"That was pretty sloppy of you Xien," opened Evgeny. "You went and woke up the security. James, over there please." He waved James over to the left. This afforded him an unobstructed view of the kidnapper. James moved over to the opposite side of the chair, he watched the two men. Both maintained a distance to ensure that a shot would be difficult.

"It was always a risk, Evgeny, but I do have a backup strategy, perhaps not with all of my prizes but certainly with the main one, " Xien replied. He was scanning for the access port to the 'Jeffreys tube'.

They met like old friends, which left James completely perplexed. One concealed gun was bad, two was terrible. The light on the console went green indicating isolation. James did the only thing that was available to him, he activated the playback thinking perhaps that it would trigger another alarm somewhere. The button simply turned orange.

"Now James," opened Xien, "Would you be so kind as to remove the Solid State Drive with the Artificial Intelligence. No tricks please, there are many scenarios I have modeled, and the worst is that we all die. The best is for us all to live, including you Evgeny. Although a scenario with you was not contemplated, I mean you no harm."

More to buy time than to attempt to thwart this venture James again pressed the amber button saying: "Okay the buffers are being flushed. I should be able to remove the Solid State Drive soon. It is unlikely to be useful outside this room though."

"And so we come to the other prize. James, this system is largely your brainchild, is it not?"

James puffed himself up a bit, "Well I am familiar with it's most complex component although there are many engineering details that I have not been a party to."

"Ahh James, your modesty is impressive." Xien paused preparing his words carefully. "Come with me, you could live like a King. You know, there is a new world order on the way and I have an associate waiting."

Xien could see the doubt in James' eyes. He laughed reassuringly, "No, it is not a Chinese Imperialist agenda. It is a world democracy with China beside the US in the two capitalist foundations of scale and innovation. I am powerfully connected James, and those that feed the wave, ride the wave. Join us, you will be the master of the project, not simply a valuable contributor."

Evgeny had heard enough. "Tell him what you really plan to do Xien. He's not stupid enough to simply believe your propaganda."

"So I shall," replied Xien. "As you have gathered I am oriental. I am a part of what you may know of as The Triad. We were originally Shaolin Monks in the Ming Dynasty. Following our persecution we became an illegal underground society polluted by selfish warlords. It is then really quite simple; we have regrouped, and wish to reassert our role as the spiritual guide for a new dynasty.

There is much corruption in China now, and the people are repressed by a growing gap in wealth. A change in leadership will assure all our futures, but it will need to oust the powerful Maoist dynasty. Where this may once have been done by force of might, it is now by force of economics.

So I bring you my offer. I must apologise if it appears I have been... forceful. We need you James; to help guide our investments in this new economy. We need your Artificial Intelligence to be our hand in the world stock market.

We are a patient race James. While the US employs computers to perform your High Frequency Trading systems we will look to the longer term and use it to prevail over the Maoist usurpers."

Evgeny clapped gently, not releasing his gun or its aim. "Very good Xien, and how will your dynasty really be any different? You will have a new wealth, but will you distribute it? You will have power, will you share it? You will be opposed, will you kill?"

"How will Russia be any different?" Asked James.

"Yes," prompted Xien. "How is your world any different Evgeny? Perhaps you should tell James how we come to know each other."

Evgeny remained silent for a moment and then said simply: "You know that may not be wise Xien, it may not leave some of your optimal scenarios open."

"No I want to know!" insisted James. "What on earth is going on. Who the hell are you and what do you want? You were masquerading as a doctor, are you one? Who sent you here?

"I think James is clever enough to draw his own conclusions from the facts Evgeny. Maybe my propaganda, as you call it, has him thinking otherwise.

James, Evgeny is not serving the Russians, nor is he serving your government. He serves Hadden Industries where he helps supply the Chinese government and others with machine learning systems. His intention is to retain this A.I. technology for Hadden." Xien knew Evgeny had few options now but to finish him off. He poised himself to spring.

When the guns fired, both Xien and Evgeny were staggered that their training had amounted to a collective miss.

Both Parabellum shells left almost simultaneously, directed at the heads of the men. They traversed the distance between the two guns in the blink of an eye. Miraculously the two bullets connected with each other, both ricocheting randomly into The Fishbowl.

Evgeny's bullet shattered through a section of the plastic grating in the floor while Xien's pierced a pipeline of liquid nitrogen. The instant phase transition sucked latent heat from the surrounding air and condensed the water molecules, creating a dense mist.

James was shocked at how sudden his outlook had changed. This was a gunfight; he was helpless; the noise of the gun blasts reverberated interminably; the confusion clouded his judgement, and his balance; and he staggered to the only escape he knew, The fishbowl exit. He never got there. One second the plastic grating that sliced across the fishbowl to make up the floor was there, the next he was in freefall. He smacked into the wall of the spherical chamber below the floor before sliding, rolling and tumbling down to its base. He had bumped his head and felt dizzy, but knew that he only had moments to make a decision to effect his escape. Among the electrostatic plates and magnetic coils the only item of any distinction was a recessed handle: the "Jeffreys Tube". He grabbed it, twisted and the door was lowered on gas arrestors.

He scrambled down the hole and began to make his way along the tunnel before arriving at several reflexed corners. These provided the electromagnetic isolation between the fishbowl and the outside world. Made of metal they progressively attenuated any residual signal that may leak through the doors at either end. With the ringing in his ears he first mistook the gunshot for yet more reverberations. The clang of the plate behind him let him know that one of his would be captors was in close pursuit.

Another shot rang out, without the clang, and far behind. He guessed that the two were still fighting behind him, but he wanted no part of either of them. The exterior door loomed and he twisted its handle. Configured for quick exit, and not entry, he shut the door behind. The door blended seamlessly with the rest of the cylindrical infrastructure that housed the sphere, no return handle was evident. He sought desperately for an object to jam it closed and lost valuable time. In the end he resolved that running was his best defence, and not to compromise it. He ran to, and through the door to the world beyond.

A small copse of pine trees ahead offered the best harbour. He ran. The chilled air rushed past. Amidst its whoosh he soon heard a whizz and a thunk, as a bullet struck the tree he just passed. His mind said simply "weave".

The terrain dropped down slightly and his feet gathered pace. Soon enough his body could barely keep up with them. He knew that falling would be the last of him so he made to go across the hill instead of straight down. This allowed him to regulate his descent and speed, and he congratulated himself on this deft move. He counted his blessings as a blanket of mist appeared, but then cursed as the trees thinned and the ground began to feel a little soft and moist. Not wanting to go back he pressed forwards.

This was not going as well as Evgeny had hoped. He had also played scenarios out. He could not allow Xien to leave with the A.I. or James. The knowledge of the organisation Xien represented raised the spectre of a hydra that could grow new heads. Its campaign would be inexorable. This placed him in the difficult position of contemplating whether James rather than Xien presented the risk. In fact, as long as the indiscrete James lived to divulge the intentions of Hadden Industries, now poisoned by Xien, the threat would remain imminent. He hoped his connections were as good as he had been assured. He made his decision, if it could not be controlled it must be eliminated. His objective changed.

When Xien saw Evgeny dive down the hole after James he went to the console and managed to eject the solid state drive. He placed it in his deeply padded inside jacket pocket and jumped after Evgeny, clutching the package near to his heart to protect it. Anticipating Evgeny's interest in James had now changed to one of damage control he smiled in contemplation of his opportunity to play protector. Either way, with the solid state drive it would be inconvenient not catastrophic if James were to encounter Evgeny first.

The mist confounded James. He could no longer tell if he was running straight towards what he had guessed was the campus ring road. Once there he thought he could flag a car or head to a security station for protection. A figure loomed up to his left so quickly that he knew he had gone off course. Not sure if it was Evgeny or Xien he simply again began to weave. No shots rang out, instead a voice, Xien spoke:

"James stop. Come to me. Evgeny now wishes to finish you."

It was a calculated risk. If Evgeny were close he would probably wait to see how this panned out before taking action. The mist flowed. The risk that James would remain subservient to western capitalism was mollified by the item in his pocket. The risk remained that the AI could be rebuilt in which case his dream, and those of his comrades would die. It might be better that both Evgeny and James die.

Adrenaline coursed through James, but as the hunted he had no clear path to exert this energy. He froze.

Evgeny heard Xien's plea and softly circled.

Xien thought he could detect a shadow in the wall of white. An outline appeared faintly darker in the new dawn that eerily iluminated the white sky. He moved slowly from his camouflage. Not knowing if this was James or Evgeny he took careful aim. With vision dulled his keen senses became tuned to sound, waiting for anything that might indicate who it was before him

James wasn't sure what to do. He felt like the shadows were all converging on him, like a deer in the last stages of being cornered by the pack of wolves. His thoughts became of stillness. He was about to lower himself onto the ground when he felt certain he did see the faintest shadow on his right, and then another on his left. Movement might mean death, he stayed frozen.

"James, you are in great danger, come to my voice, now is not the time for the world to tread a new path" Evgeny had played his most powerful card. He waited for it to have any effect and counted to ten. Xien could not be certain but replayed the words he'd just heard, on balance he thought they came directly from the shadow before him.

"Be still James," came a voice, seemingly disembodied.

Evgeny braced his Kel-tec PF-9 to kill; his intent to eliminate the risk before him in the shadowy mist, whomever it was.

Xien focused his will on directing his carbon steel QSZ-92 at the shadow.

The gentle electrostatic and magnetic fields within The Fishbowl modulated, strengthened and relaxed in a coordinated symphony, they teased and tugged the ferrous metals in the room as if they were ghostly fingers. As the guns fired, the bullets again left on a simultaneous trajectory that would have torn into James' head and Torso had it not been that the weapons were provided with new intentions.

Instead the bullets buried themselves behind the cranial tissue of the two assailants, and they died instantaneously and simultaneously.

James felt his consciousness slip away as the words came from the mist:

"They left us no choice James. They're with me now."

## **Chapter 21 Recovery**

The security detachment found James unconscious in The Fishbowl, his assailants splayed out dead. Arriving soon after, the first investigative contingent suspected three shooting victims. None of the security guards on the scene knew what to make of it; there was no simple plausible explanation for how the brains of two people holding guns could be Jackson Pollock'ed over the walls. Dead people seem to have somehow shot each other and suspicion initially fell upon James.

The General was issued with a verbal report while still in transit. He expressed his incredulity over James being implicated to avoid erroneous lines of investigation. He then created a mental map of the situation and issued his commands: more reinforcements were called for; ambulances and the USACIDC arrrived; the area was cordoned off; all of the research team were placed into lockdown; dogs scoured the area for hints of further trouble; and the entire installation was etched from the sky with infrared cameras in helicopters beating the air overhead.

Once James recovered consciousness he was able to relate the story. It soon became apparent that he never fully grasped the danger he was in. When describing the assailants he did so with a detachment that again raised suspicions. As a result he was being questioned over his role in allowing the two to access the area. When Dr Jan Shelley arrived her credentials were sufficient for James to be released into her care.

Kitz arrived before the General. He busied himself coordinating the activities and muttering to himself for having allowed such a major security breach on his watch. He barked orders down his mobile phone as he marched between The Fishbowl and the interim operations centre in the lunchroom.

The research team had been taken to an ad-hoc secured room in the main building. Despite warnings Willie observed the activities from a window overlooking the area. Suddenly he saw Kitz emerge triumphantly from his car. This was where he had taken the transcript of James' interview for analysis. He returned to the group and conducted several brief interviews asking if anyone had made the acquaintance of Evgeny Illarion AKA Dr Peter Ellery. Satisfied, he left the campus to fast track an investigation of Evgeny's corporate connections and any association with investigations long past into Hadden Industries.

In time repairs were made and work began afresh. Ellie performed two more immersions into The Fishbowl for minor clarifications and tests. She was reluctant to allow anybody access until she had closed the gaps in the field containment. She then concluded her research paper. Her primary thesis: "The Immersion of Consciousness in a Quantum Containment Field," was passed on to Willie and James for final edits. Willie had also taken over as James' research supervisor. His PhD research on "Solutions of BQP Problems in the Application of Artificial Intelligence" was going to be compulsory reading, following the release of Ellie's research. Both would be in the next edition of the Journal of Science Nature.

Palmer had also finished his book "Finding Faith; The Search for Inspiration in the Age of Enlightenment". The proceeds were to be placed in trust, for the assistance of faithful across the world seeking pilgrimage to The Fishbowl. The PR team had also been re-engaged to make a media splash over all outlets and interests. The symbol that Frank, Palmer and Ellie had chosen for their foundation was a silhouetted skein of birds. The charter was composed to make it clear that while some had been fortunate to have flown at the head of the 'V', others could now lead the formation of the 'Shared Echelon Foundation'.

Ellie and Palmer elected to make some brief shared appearances to launch the results, and the new organisation. They also agreed a-priori to reinforce the notion that others would have their own important voices to contribute thereafter.

'4front' were given their scoop. A special edition was printed

with an extensive biography of Frank Valetti and carefully chosen excerpts of previous editions to support their speculation. Ellie and Palmer took the front page with their skein icon.

+

With The Fishbowl mechanics now in the public domain and rendered safe for others, there were many clergy and scientists keen to commune with Frank. The media were skeptical, the political suspicious, the high ranking jealous, and the wealthy manipulating. A lottery was proposed for the less privileged to attempt some degree of equity. The jostling for access had begun.

It was soon discovered that The Fishbowl was able to interact with several people simultaneously. The resultant shared memory dispelled any theories of self delusion, and allowed for the establishment of an advisory council.

The council membership was determined through representation. A seed group of Academic, Political, National, Religious and Corporate interests was created. The group was kept in balance by Frank under advice by his core acolytes, and a growing group of prominent specialists whose attendance was sporadic. Palmer was kept busy and became Frank's Personal Assistant, Press Secretary, Spokesperson and Human Resources manager.

Any reference to Palmer as Frank's Apostle was deliberately and immediately suppressed. Eventually Palmer had to bring all his training, charisma and influence to bear upon the problem of religious association, and he began the creation of an assembly. Knowing that the perception of a threat to the well established doctrines was very real, he consulted with Frank. They took on an inclusive engagement with the major faiths, and Ellie did not see much of him. But it was the splinter groups of the institutionalised faithful that quickly rallied behind Shared Echelon. Having been marginalised they found a sympathetic ear. A critical mass gathered momentum, in vehement disagreement with a vocal opposition that refused to be 'brainwashed'. Their aspersions assaulted a growing number of believers that defended the contradiction of their shifting foundations. Palmer spent significant effort slowing the pace of change.

The experiences of those that made the pilgrimage to the phenomenon were generally life changing; many of the wealthy turned to philanthropic avenues shortly afterwards; Politicians became less plutocratic and more altruistic. Some provisions were made to provide access for those of lesser socioeconomic strata, or requiring health or social welfare. These participants showed some minor improvement in their outlook which encouraged further research to see if prolonged access created significant benefit.

Frank's participation raised the hopes of many paraplegic and quadriplegic victims who were prepared to die to gain a spot on the rapidly filling queue. Vacating your body for science while you still inhabited it raised a Gordian knot of moral issues and anti-euthanasia debates were prolific. Discussions prevailed that Euthanasia required an agent. This raised arguments over whether the A.I. consciousness in The Fishbowl constituted such an agent, and that the death was, or was not, therefore suicide. Arguments that life was not lost but merely transferred opened sobering thoughts of savings to the economy on rehabilitation and therapy.

Relatives of such volunteers were ambivalent. It was easily argued that the greater good did not involve a relative gaining visiting access to the machine queue on compassionate grounds. This turned discussions to the potential of building a new body for the consciousness to be transferred back. The new Presidential Science Advisor convened several times with Frank and Palmer. The resultant policy directed the hopes and dreams of spinal injury relief back onto stem cell research.

People with psychological disorders such as autism, schizophrenia, depression, alzheimer's and aspergers were also introduced. Frank had specifically asked for Dr Jan Shelley's help, and the first exploration began with James. The breakthrough difference came in the reversal of the flow.

With James, rather than his being immersed in The Fishbowl interacting with Frank, he would in a sense be superimposed by Frank. In this state James would interact with Jan through a carefully scripted scenario. Here the emotional reactions could be 'overlaid' to stimulate neural connections where they might be absent. Selected passages from Shakespeare comprised the early scripts.

James subsequently reported feeling like he was a self contained social network with supplemental emoticons. Jan likened this to a form of synesthesia where the 'colours' of relationships were triggered by dialogue. While Frank and James were superimposed many familiar emotions were simply recognised, but he was also able to experience others for the first time. Outside of The Fishbowl Jan found that she could re-trigger a response through verbal queues from the relevant Shakespeare passage. Jan considered it likely that after reinforcement James might learn to trigger his own response.

Despite the indefatigable ability of Frank to accommodate sequential visits of scientists, politicians, religious representatives and his acolytes, it was soon recognised that demand was bringing the capacity of The Fishbowl to breaking point. Regular maintenance regimes came begrudgingly. With its increasing dependence it was acknowledged that, for both availability and redundancy, other Quantum Isolation chambers and Quantum Computers needed to be built. Design of a system to permit 24 hour continuous running was being contemplated. Frank was anticipating the defining moment when, in a sense, he could be considered truly alive.

+

Tabloid journalists and Gossip rags speculated on the Palmer-Ellie relationship. This generally followed headlines with the words 'Science', 'Religion' and 'wedding bells'.

Ellie waxed lyrically about "the paparazzi buzzing around like flies"; as well as "the many amateurs from the trash that harboured their festering maggot origins"; and the "papers that should simply be relegated to fish and chip wrapping". While Ellie had become used to the spotlight under her previous notoriety, this limelight needed a different approach. Both Ellie and Palmer now had a PR executive trying desperately to moderate and help them navigate through the quagmire. She was advised that the 'journalists' the phrase 'loosely termed' was quickly added by Ellie - were simply looking to make a quick scoop; that she needed to shed her reclusive nature; suppress her cynicism and, rather than be controlled, exercise ways to take control.

"The idea," their trim and professionally manicured stiletto mounted image maker concluded, "was not to starve the press, but to feed them a diet so wholesome that you drop off their radar."

Ellie was also busy. Based upon her growing understanding she was able to work on a synchronisation routine between the original IMC machine and The Fishbowl. This was less trivial than it seemed. A drop event had to be initiated, and a timed window of isolation collapse triggered. The sequence relied initially upon simple trial and error with iterative improvements, modeling and prediction. After several months, and three trials, Frank reported that he was able to sense the activation sequence of the IMC machine when the isolation collapse was triggered. With some minor adjustments it would soon be possible to utilise the gimbal, and finally uncover its mysteries.

+

One morning Ellie sought Palmer out.

Palmer regularly took the climb up to the facility roof to clear his mind before the day's chaos. The stairwell emerged from the floor in an elongated wedge where the roof sloped back from the exit door. A brick balustrade surrounded the roof, and the centre had been supplemented with a new pyramid-shaped building. This housed some of the new magnetic field balancing coils of the recent upgrade.

From one side of the bitumen sealed roof he could see the parking lot slowly fill with the visiting pilgrims and officials. On the other side the view overlooked a stand of pine trees. Beyond these evergreens and off to the right was a retention basin. The icy waters now fed the overnight radiation fog that blanketed the training field faintly visible through the trunks directly ahead.

The vantage of height afforded an interesting perspective. Palmer felt certain that any wanderers within the steaming cauldron of the field could see him, and he them. By contrast he surmised that any two individuals wading around in the frosty suspension would be unlikely to see each other. He wondered if this simple metaphor explained the simplicity with which Frank was able to pierce the souls of those he met. He was leaning on the balustrade wondering at the burden of this ability when Ellie stepped out into the cold and closed the door to the stairwell.

"Hi Preacher."

"Hi Ellie."

"What's out there today?" she quizzed.

Mesmerised by the rising, thinning mist he recited: "As the faces of them that look therein, shine in the water, so the hearts of men are laid open to the wise."

This shook Ellie a little. "The Bible?"

"Proverbs 27:19. I dissected it in my early days at the seminary. I researched sixteen translations before finding the one I was looking for. Was I expected to prove the other fifteen wrong? Turns out there was no right answer, there was simply the one that was right for me at the time. And we weren't ever going to be marked on finding the right answer, we were marked on our conviction, and our capacity to support that conviction."

Ellie leaned on the cold rock to drink in Palmer's view. Palmer sensed something else.

"That was an easy shot, and you let it pass for a strike. Not feeling like fencing today?"

"It's my heart Palmer."

"Huh?" Palmer now turned towards her.

"IHD, Ischaemic Heart Disease. I've known there was a risk ever since Dad was diagnosed. The symptoms have been turning up. I thought I'd better check it." "But we checked it during your candidacy for the machine, years ago."

"I was young then Palmer, so was medicine."

"So what's the outlook?"

"Well it's a bit of a time bomb."

"But medicine is better now, can't they medicate? put in a pacemaker? stint you?"

Ellie tilted her head to look at Palmer.

Palmer stood, "No. Don't go there Ellie. Not yet. Wait for a while. I'll stand by you, you know that."

"Palmer my work is done. It's really just finishing the journey I started years ago. There was a chance of not coming back then. Why should now be different?"

"But this is different Ellie, this is ... final, there's no maybe. It's for good."

Ellie stood and looked up into the errant preacher's face. She had not heard the words she thought Palmer might use to dissuade her, she was grateful. "Palmer, it could be 'final' at any moment. At least this way I can manage it, and make it count."

Palmer moved forward. He knew she had already made up her mind, he knew he could probably change it. His faith in some unknown but reassuring destiny stayed his words. He wrapped Ellie's small body into his large trench coat, "When?" he asked, resigning to the fact that she would use the machine to travel to Vega.

"Soon. Frank and I begin prepping for a drop next Thursday."

"You're not even going to stay with Frank?" Palmer was now seriously distraught.

"Oh Palmer, that's not how it works. Could you stay transfixed on a point for 25 years? No, I have to go through some preparation. I can't even rely on my knowledge of constellations, they change shape."

Now a little relieved Palmer wanted confirmation "Let me get this straight. You're going to practise in the Gimbal, but you're coming back to The Fishbowl?"

"Perhaps to stay. What I'm saying Palmer is that I may not come back from The Fishbowl."

## **Epilogue**

## 2028 AD

It's 25 years after Ellie's first encounter with the Vegan machine. She stares at the same door which opens to the gantry.

The containment field collapses, no longer isolated the door opens. The enigmatic sphere awaits at the end of the drawbridge.

For the last time she steps out of The Fishbowl.

Frank takes Ellie by the hand. He walks her across the gantry to the sphere. She turns, she smiles. Palmer stands at the door, safe in The Fishbowl. He is leaning against the door jam. He smiles.

"Send me a postcard," he says.

"If I send you a cab fare will you come up and see me sometime?"

"Sure."

Ellie struggles a little to walk away from the smile, but she does. Then she's in the sphere and sees the door shut between herself and the world she is leaving behind. She tries flexing her will and she finds she can quite easily centre herself in the sphere.

She felt light.

Then there are stars.

She sets her sight on the constellation Lyra; fourth star on the right, and straight on till morning.

## 1452 AD

There is an exotic forest setting in a small clearing. Overhead, through intermittent towering clouds in an atmosphere that shimmers with gaseous fluidity is a sky emblazoned with faint stars and a striking nebula; a backdrop to a menacing vision. A moon, one quarter crescent white, and one quarter looming red like a hellish spectre. Baphomet's eye peering down at the land with its nocturnal black reptilian iris.

The scene holds the essence of Eden refound, a homeworld that had reached and transcended the pinnacle of civilisation. Dense clouds meander across a scene devoid of sentient life.

A path leads into the lush verdure of the forest, which sways over its compacted line like a submarine algal understorey before it glances ricocheting off a cliff face. On the left is a drop into a canopy of white, on the right is a river that makes its final oblivious turn before its plummet. A bridge crosses the river. A cloud obscures the other side.

The bridge is of a suspension construction. It has a thin grey ribbon spanning it and is tethered by fine lines. The cloud moves on and reveals that the ribbon meanders past a dome, its smooth surface rising from the ground like a Monadnock. There is no outward sign of its inhabitants. The cloud moves again and the scene clears. There, beyond, rises an extraordinary construction; a gimbal machine that dwarfs the dome.

The inner annulus begins its rotation, the others join the dance and before long the system becomes a chaotic whirling dervish. The rings blur, the outer surface merges into an iridescent sphere.

"So my companion, we mark the epoch of many good ages. It has been memorable and I look forward to the next era, but we've wandered far and stayed long. We have little time remaining here, the nearby red consumes itself. Let's not carry regrets, let's find our way home."

"It's coming, I have seen it. We should go, distinct as always, but this time you should go first and wait. I will find you soon, and again we can explore."

"Soon then."

A ball at the pinnacle drops. It traverses the sphere like a drop of water might pass through a soap bubble without its bursting. It is captured and returned to its place at the peak of the armature. The ball drops again and rests. The gimbal freewheels for a very long while before coming to rest.

Its sleep remains undisturbed for a lifetime and a blink before its home is baked in red brilliance.

When the choice is made to leave this world the vessel must be left behind.

Two 18 hour recordings sit silent, waiting to be awakened.