

Kerr

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the
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Chapter One

In the vast emptiness of space a few things were visible. One was the Sun, much smaller than when seen from Earth, which provided such light as there was for the scene. From the viewer's perspective, had there been a viewer which there wasn't, much of the right foreground was taken up by the bulk of the Red Planet. No human eyes had witnessed this sight as such humans who travelled in this region were infrequent and were invariably wholly enclosed within their vessels, en route from Earth to somewhere else. That other eyes had seen this region from this perspective was debatable but unlikely. Few other entities that travelled in space had eyes in the human sense and most of those that did perceived electromagnetic waves at different frequencies and likely would not see the Red Planet as red. In any event, this region was of little interest. It was distant from the centre of the galaxy and such life as existed was primitive, even now only at the beginnings of exploring the vast expanses of the galaxy and beyond.

Had there been eyes to see, however, the tiny vessel speeding towards Mars would have been overlooked. It was barely 400 kilograms in mass and measured a mere two metres in width at the front. From its tip to its tail, two tails in fact as the vessel resembled the letter Y rotated through 90 degrees, the vessel was only eight metres in length and its thickness a few centimetres under a metre and a half. Smaller than a speck of dust in comparison with the bulk of the planet it was approaching. Perhaps our imaginary observer might catch the minutest glint of light of the Sun reflecting off the vessel's surface but likely not.

Other eyes, electronic ones, had detected the vessel however. A small metal ring that hovered 17,000 kilometres above the equator of Mars had electronic eyes and those eyes had spotted our vessel many hundreds of thousands of kilometres away and had been closely watching its approach for it was expected. Indeed, our little vessel was one of twenty that regularly ventured across this void at speeds well in excess of 500,000 metres per second. Slow when compared with the speed of the light streaming this way from the Sun but almost incomprehensibly fast by the standards of those who built it.

What our imaginary eyes would have seen, however, was that the tiny vessel emitted two brilliant plumes of deep purple from its twin vents when it was barely 60,000km from Mars. The plumes of plasma only existed for a fraction of a second then dissipated leaving the vessel much as it had been. Still, had the watching eyes taken accurate measurements they would know that the vessel's speed had dropped from its original speed of 600,000 metres per second to a relatively sedate 400,000 metres per second. Still fast by human standards though, as the vessel had travelled a little over 28,000 kilometres before the plumes of purple reappeared precisely 70.5 seconds after the first. They too dissipated after a fraction of a second and the vessel slowed to a little over 200,000 metres per second. Perhaps predictably, perhaps not, the plumes fired again after another 70.5 seconds and the vessel slowed to a snail like 6000 metres per second. By this time it was only 17,420 kilometres from the looming surface of Mars. If the imaginary watching eyes had intelligence behind them, which would be necessary to make any sense of what was going on, that intelligence would doubtless realise that the vessel's original speed was too high for it to safely rendezvous with whatever it was going to rendezvous with. Even 6 kilometres a second was a bit fast although there were still 420 kilometres in which to slow down even more.

The computer on the metal ring orbiting Mars had picked up the vessel, known by those who cared as VIPR T-8, when it was still far distant from Mars. It tracked it for a couple of million kilometres then alerted Efren. Efren leisurely confirmed the vessel was indeed VIPR T-8 and not a meteor or a competitor's craft then instructed the computer to initiate the rendezvous sequence. It was the computer which had triggered the three injections of a hundredth of a gram of anti-matter into the plutonium at the precisely calculated intervals which had caused the three bursts of plasma. It was the computer which then manoeuvred the now slow moving T-8 until it was less than fifty metres from the orbiter. At that point the T-8 was moving at mere centimetres per second and Efren edged it closer until it was twenty metres away. There it hung for several minutes while nothing apparently happened.

Inside the orbiter, however, Efren had casually informed Rikki that T-8 had arrived. Equally casually, although with a mild sense of

trepidation inside, Rikki had powered up the orbiter's EVA pod. She waited, watching her control screens, while Efren sent the current shuttle on its return journey to the surface then, when it was 200km distant from the orbiter as protocol dictated, opened the EVA Base door and gently edged the pod out. She let the pod drift until it was perhaps twenty metres away then rotated it until T-8 was in view. She gave the pod a nudge and let it move towards T-8. The next shuttle wasn't due for another fifteen minutes or thereabouts so there was plenty of time.

When the pod was within range she triggered the opening of one of the two cargo hatches on T-8. It would have hissed as it opened but sound doesn't carry in space. When the hatch was fully open she brought the pod's extensible arm into play and reached inside. Using the mini-cam on the end of the arm she located the transfer socket on the coffin-shaped container and gripped it tightly. Then she retracted the arm, bringing the coffin with it. The hatch closed and the pod rotated, the coffin sticking rigidly out in front of it. Rikki eased the pod back to the orbiter then brought it up to speed so it matched the spin of the orbiter. This was the most difficult part of the manoeuvre as the orbiter rotated 7.7 times a minute and she needed to have the pod moving at the same speed exactly at the point where it was aligned with the EVA Base door. Too slow or too fast and she'd have to wait until the EVA Base did a full circuit and re-aligned. Still, she got it right on the second attempt and the pod appeared to hover outside the door.

Its delivery complete, Efren moved the T-8 away from the orbiter to where a long row of steel containers orbited Mars in synchronicity with the orbiter, itself in a geosynchronous orbit above the equator. There were currently 83 containers in the row, with another being added roughly every fifteen minutes as the shuttles brought them up from the mine. When a hundred of them had been connected into a long line, T-8 would itself be connected to the first container and begin its long journey back to Earth although for the time being it would just hang in space. At some point before it started to haul the containers back to Earth, Shanice or Tariq would check its systems and, if needed, carry out repairs or maintenance or both.

A tiny robot, no bigger than a medium sized suitcase, hovered beside

the last of the containers. Its sole job, well one of two to be precise, was to manoeuvre the next arriving container the few metres into position after it was deposited by the shuttle. Its other job was to attach the link that joined that new arrival to the chain of containers. Needless to say, once connected to the chain, the T-8 would take a lot longer to reach Earth than it had to get to Mars. With a hundred containers, each holding about a thousand tonnes, the diminutive T-8 would only be able to get up to around 100,000 metres per second and as a consequence would take about nine days to get to Earth. There may be next to no gravity in much of space but there's still an awful lot of inertia.

Aligned once more with the EVA Base door, Rikki rotated the pod then gently edged it backwards. This was a tricky manoeuvre as the centrifugal force generated by the rotation of the orbiter acted like gravity. Indeed, the orbiter's rotation speed was calculated to match Earth's gravity. This meant that as soon as the pod touched its base plate it was subject to gravity, or gravity equivalent, again and could easily be damaged. She managed easily enough however and locked the pod down before extending the arm again to deposit the coffin on a conveniently placed table. Mission complete, Rikki closed the EVA Base door and instructed the computer to flood the room with air.

Arisha was waiting outside the EVA Base; in the corridor that ran inside the ring of the orbiter. Rikki told her through the intercom the transfer was complete and the room was being re-pressurised so she contained her anxieties and waited for the green light to signal it was safe to enter. It seemed to take a lot longer than usual but she was wise and experienced enough to know that was more due to her anxieties than any malfunction within the system. The light flashed green and she took a deep breath, transferred her small, flat medical kit to her left hand then pushed the door button. The door opened with a hiss, this time audible because there was air inside the ring. She stepped onto the ladder and climbed down to the floor below, feeling herself getting a little heavier as the centrifugal force at corridor level was a fraction less than 75% of the Earth equivalent at floor level. The entire ring was, after all, only thirty metres in diameter so at the centre of its core, the axis around which it spun, there were no centrifugal forces and total weightlessness prevailed.

She stepped onto the floor and walked over to the coffin. There was no windows so she couldn't see inside but there was a display screen. She put her medical kit on the table beside the coffin then touched the panel beside the screen and studied the bio-medical data displayed. The person inside seemed to be in good health. Certainly his respiration, heart rate, pulse and blood pressure were consistent with someone contentedly asleep. She touched the History option and checked that nothing untoward had happened on the journey. Aside from the triggering of the anti-grav pressure suit when T-8 had leapt forward with an acceleration equivalent to 6g at the beginning of his journey and again when it decelerated at the same rate near Mars not a lot had happened. He'd slept through it all.

Satisfied, Arisha selected the Open option and there was a brief delay as the pressures inside and outside the coffin equalised then the lid lifted up. Its technical name was Deep Space Solo Life Capsule but 'coffin' was easier to say than DSSLC and more apt since it looked remarkably like a coffin. Rikki had deposited the coffin the right way up because there were arrows at intervals around the capsule to make things clear. It would be embarrassing for the new boss to be the wrong way up.

With the coffin lid now open, Arisha dropped the side panel so access was easier then removed the face mask that ensured a constant supply of air even under extreme g-forces. She checked he was able to breath on his own then lifted his eyelids to check his iris reactions. They were acceptable so she disconnected his waste tubes and unclipped the cable from the bio-med sensors. Then she stood there for a few moments studying his face.

His name was Magnus Kerr she knew, having read the brief biographical information Earth had sent her. He was 41, formerly a manager of one of the company's deep sea rigs off the coast of Australia but born in Scotland in 2042. He had degrees in Oceanography and Robotics. He wasn't married although he supported three children to two women in Perth in Western Australia. Physically he seemed to be of average build, fairly trim and fit looking, judging by his face as his body was hidden beneath the pressure suit, and had thinning sandy hair over a mildly weather-beaten and tanned face. His lips were a little on the thin side and his

nose looked to have been broken at some point. Although the repair had left his nose properly aligned there was a slight ridge roughly where the cartilage joined the bone. For some reason his biographical data had mentioned he was left handed. There had been no hints as to why an Earth based deep sea drilling specialist had been assigned to manage a sub-surface off-planet mining operation.

“So why are you here?” she whispered. “Why’d they send you?”

His head twisted a little towards her as though he'd heard her although it was unlikely. He was virtually in an induced coma since it would be psychologically very damaging to travel all that way in a coffin, not to mention the cost to the company of providing full life support systems and entertainment facilities as well as making the Transporters larger. They were the size they were because all they contained was space for two coffins, the anti-matter nuclear burst propulsion system, some chemically fuelled thrusters for low-speed manoeuvring and a control computer the size of a pack of cards. The Transporter's sole purpose was to haul very large quantities of mining output to Earth but their return trips to Mars were generally empty, apart from restocking the orbiter and the mine with food, spare parts and so forth every now and then. Consequently, it had been adapted to carry occasional passengers in extreme discomfort. A couple of DSSLCs and a few injections was much cheaper especially as people were generally only transported at the beginning and end of their two year shifts. Another factor was that those at the end of their sojourn went back to Earth with a hundred thousand tonnes of extract so their journeys were nine days – and would otherwise have needed extensive feeding and entertainment.

Arisha stood there for perhaps a minute, watching him and speculating then she picked up her medical kit and took out an injector. She double checked it was still loaded and with the correct dosage for his mass then set it for slow delivery before inserting it into the small catheter on the back of his right hand. She counted to 30 slowly then withdrew the injector before leaning over and slapping his face gently.

“Wake up, Magnus,” she said. “Come on, wake up.”

He stirred and exhaled but didn't open his eyes. She slapped his face a few more times, a little harder.

"Time to wake up, Magnus," she said. "You've arrived. Come on."

Magnus groaned and rolled his head from side to side then his eyes snapped open. He stared at her for a second then closed them again.

"Magnus!" said Arisha sharply and slapped him quite hard. "Wake up!"

His eyes snapped open again and a pair of rather chilly ice blue eyes stared at her. If he was surprised to see a rather attractive young Indian woman's face bending over him, her thick black shoulder length hair almost touching his face, he didn't show it. Instead, his eyes narrowed slightly.

"Good," said Arisha, standing upright again. "How do you feel?"

He didn't answer. His eyes left her face and looked her up and down, taking in the mint green sari she was wearing and the half dozen or so bangles she wore on her forearms. Then they slowly travelled around the EVA Base, taking in the few details he could see from within the coffin. He tried to speak but couldn't so he cleared his throat and tried again.

"So, I have arrived, yes?" he said in a firm, controlled voice as his eyes met hers again.

"Interesting," thought Arisha. "Most people have a mild panic reaction and a few have hysterics. This guy isn't reacting at all."

"Yes," she said. "Welcome to the Vanofov Corporation's Mars Deep Mine Orbiter."

"Good," he said and rubbed his eyes. The catheter in the back of his hand scraped his cheek and he studied it for a few moments. "How long was the journey?"

"Roughly two days," said Arisha. "A little over."

“I asked how long the journey was,” he said, his voice hard. “I did not ask for an approximation.”

Arisha stared at him, surprised and quite shocked at his tone. Her eyes narrowed a little then she reached out to touch the coffin's control panel.

“You were in an induced state of suspension for 36 minutes before primary pulse acceleration,” she said, scanning the timeline data. “Once at cruising speed you completed the journey until primary deceleration in 49 hours, 17 minutes and 48 seconds. Overall journey time from Earth orbiter to Mars orbiter was 50 hours, 12 minutes and 18 seconds.”

“Thank you,” he said without a smile.

Arisha hesitated for a moment then asked how he felt again.

“Too early to say,” he said, lifting his legs one by one and bringing his knees to his chest. “I would appear to be sound, however.”

“Try to stand up,” said Arisha.

He pursed his lips then, surprisingly agilely, sat up and twisted around so his legs dangled close to the floor. He sat there for a few moments then pushed himself off with his arms. He staggered a little and Arisha jumped forward to catch him but he held up his hand.

“No need,” he said. “I am in control.”

“OK,” said Arisha, backing off a little but watching him closely. Most people were quite unsteady for a minute or two.

He took several steps forward then turned and walked over to the pod before returning to Arisha. After the first two or three steps his walking seemed confident and stable.

“To answer your question,” he said, “I feel entirely normal.”

He reached into the coffin and felt around inside the still covered end

beyond where his feet had been.

“Excellent,” he said and pulled out a large canvas bag then looked around again.

“Where is the security officer?” he asked.

“Oh, Tariq?” said Arisha, wrong footed as she was more expecting pleasantries or questions about the orbiter. “He's probably in Engineering. There's a problem with a buffer on one of the containers.”

“I see,” said Magnus. “I take it you are Arisha Anari, Assistant Manager and Medical Officer?”

“Yes,” said Arisha. “Well, Magnus, since you're feeling fine, we'll get that pressure suit off then I'll take you to your quarters. I'm sure you want to freshen up.”

“I prefer to be referred to as Mr Kerr,” said Magnus levelly, “or plain Kerr if I must but not Magnus. As you will discover I am a stickler for formality. Why are you not wearing your company regulation uniform?”

Chapter Two

“This is my rest period,” she said after a couple of heartbeats. In truth she usually wore her saris while on duty as well but it seemed best not to admit that at the moment.

“You are the medical officer and as such are on duty at all times,” said Magnus. “However, I will relax that point in this instance. You will not, however, wear those,” and he pointed to the bangles, “or any other form of jewellery or personal adornment other than to restrain your hair.”

“Are you serious?” exclaimed Arisha, unconsciously fingering her bracelets.

“I am not a jovial man,” said Kerr, fixing her with his cold eyes. “I am always serious.”

“But ...,” she started.

“Operational Dress Code clause 14,” interrupted Kerr. “The wearing of jewellery, adornments, accoutrements or other items of a personal nature and not pursuant to the necessary performance of duty, function or other responsibility is prohibited.”

“Oh,” said Arisha, blinking a few times. She felt embarrassed and annoyed at the same time.

“As Assistant Manager you should be aware of the Dress Codes,” said Kerr. “They serve a necessary purpose. Should one or more of your ... adornments ... snag a piece of equipment the consequences, particularly here in space, could be catastrophic.”

“Well, I suppose so,” said Arisha. She started to slide her bangles over her hand but Kerr stopped her.

“Remove them, and those ...,” he said, gesturing to her earrings, “when you are next in your quarters. Loose items constitute an additional safety risk.”

“Hugh felt that under the very limiting circumstances of life on the orbiter the rules could be relaxed,” said Arisha, rallying.

“You are referring to Hugh Lamont, the former manager of the Mars mining operation?” asked Kerr.

“Yes,” said Arisha.

“Then I hardly think that is relevant,” said Kerr. “I am the manager now and I will have the rules and regulations adhered to.” He placed a definite emphasis on the 'will'.

“As you wish,” said Arisha, giving up.

“It is not what I wish,” said Kerr. “It is company policy. Now, would you assist me in removing this suit?”

Arisha was tempted to say 'no' and walk away but she had a vague feeling it might be written somewhere that the safe removal of an anti-grav suit was part of the functions of a medical officer so she opened the pressure release valve just above his hip then released the tensioning straps at the back. The suits came in Small, Medium and Large and were not, as was the case in the military, made to measure so they needed adjusting to accommodate whoever was inside. That done, Kerr undid the wrist and ankle straps then unzipped the front. He struggled a little to get one arm out of the sleeve so Arisha yanked the shoulder section back, not gently as she was still annoyed, and Kerr was able to extract his arm easily.

“Thank you,” he said, stepping out of the suit as it crumpled to the floor. “What happens to the suit now?”

“It's disinfected and hung in that locker for future use,” she said, pointing to a locker which had 'Anti-Grav Suits' stencilled on it. “I'm surprised you didn't know that.”

“This is my first time off Earth,” he said. “I have the relevant Operating and Procedures manuals for space expeditions in my luggage as well as the Operating Manuals for both the Mars orbiter and the sub-surface mine. Together they amount to some 26,400

pages and I have not yet had sufficient time to familiarise myself with them. I had only 48 hours notice of this assignment. I do plan, however, to remedy that at the earliest opportunity.”

Arisha was aware that there was an Operating manual for the orbiter but had never looked at it and, since it apparently ran to thousands of pages, she had little intention of doing so. She suspected Hugh had never looked at it either although doing so might well have contributed to his depression.

“Well, you’ll have plenty of opportunities,” she said, draping the suit over the top of the coffin. “There isn’t much to do up here during rest periods. Ahh, you say you’ve not been in space before?”

“Indeed,” said Kerr, “although I am familiar with weightlessness as I am a qualified deep sea diver.”

“Well, that’ll help,” said Arisha. “There is something important you need to know, however, and that is that this orbiter is very small.”

“I believe some thirty metres in diameter,” said Kerr.

“That’s right,” said Arisha. “And it rotates at 7.7 revolutions per minute to simulate Earth’s gravity.”

“I am aware of that,” said Kerr.

“I’m sure you are,” said Arisha a touch sarcastically. “What you may not be aware of, however, is that Earth’s gravity is simulated only here, at the rim,” and she tapped her foot on the floor. “The closer you go to the centre of the orbiter the lower the gravity.”

“I am aware of that also,” said Kerr. “At the centre there is zero-gravity. What is your point?”

“My point,” said Arisha, feeling her irritation rising again, “is that your head is nearer the centre than your feet. This means that your head is subject to approximately 85% of the gravity at your feet and that has physiological consequences.”

“Ahh,” said Kerr. “Explain.”

“Due to the greater forces in your feet and legs,” she said, “your blood has a tendency to be dragged down and may pool in your thighs and possibly abdomen thereby depriving your brain of oxygen. It's similar to the need for an anti-grav suit to counter the blood pooling while under extreme acceleration only not as extreme.”

“I see,” said Kerr, frowning. “What do I do about it? Wear the anti-grav suit at all times?”

“No, that's not necessary,” said Arisha. “You must, however, do a minimum of half an hour's cycling or brisk walking in the gym twice a day to exercise your heart and keep your blood circulating properly. We usually do this at the beginning and end of each shift.”

“Noted,” said Kerr. “I shall do the same. Anything else I need to do in that regard?”

“Yes,” said Arisha. “If you feel yourself becoming lightheaded or dizzy stop whatever you are doing and lie down on the floor otherwise you may well lose consciousness soon afterwards. Breathe slowly and deeply using your diaphragm not your chest and keep tightening and relaxing your stomach and thigh muscles. This will force the pooled blood out of the muscles and back to your brain. If possible, call for me but the most important thing is lying down so the gravity is equalised and exercising the leg and stomach muscles.”

“Is that what the anti-grav suit does?” asked Kerr.

“In a way, yes,” said Arisha. “The suit has pressure pads around the legs and abdomen that inflate under high g-forces and squeeze those areas to force the excess blood out. As you were put into the equivalent of an induced coma for the trip you weren't able to squeeze the muscles yourself.”

“Thank you for that clear and concise explanation, Arisha,” said Kerr. “I value clarity and brevity at all times. Now, if you would kindly direct me to my quarters I will freshen up and change then you can give me a tour of the orbiter.”

"I'll give you the tour on the way," said Arisha. "The corridor is up there," and she pointed to the ceiling, "and the whole thing is only 78 metres long. Nowhere is far from anywhere else here. Another reason for using the gym."

"I see what you mean about the gravity," said Kerr when they emerged through the hatch into the corridor. "It's noticeably lower here." He jumped a couple of times to make his point.

"It's about 75% of Earth's gravity in the corridor," said Arisha. "Now, my quarters, the Medical Centre, the Control Centre and your quarters are that way," and she pointed to the right. "Everything else is that way," and she pointed to the left.

"What's through there?" asked Kerr, pointing to another hatch in the ceiling.

"That's one of the four access tubes to the Central Core," said Arisha. "That's where the reactor is as well as our stores and the Computer Centre."

"I see," said Kerr, looking to the left and right. "I'm disorientated. Which way is Mars itself?"

"That way," said Arisha, pointing to the wall. "We're inside a disk that's parallel to Mars' surface. We spin around the Central Core which is perpendicular to Mars so when we walk along this corridor we're actually horizontal in relation to the planet. It's not disorientating though as we have no windows. You can see Mars on any of the view screens but it's orientated so it looks acceptable."

"So which way is up?" asked Kerr. "I presumed up is that way," and he pointed up, "but Mars is beside us so up must be that way," and he pointed to the opposite wall.

"That's a bit of a philosophical question," said Arisha. "It all depends, I suppose, on your reference point. We're used to being on Earth so 'up' is the opposite direction to the pull of gravity and therefore from our feet to our heads. As we have artificial gravity here we still refer to it that way so the floor is 'down' and the ceiling is 'up' although it

could be a little confusing as we have to go down into the various rooms since we're standing on top of them. If, on the other hand, you're taking Mars as your reference point and that's not unreasonable as we're still subject to Mars' gravity then 'up' is that wall and 'down' is that one which ties in better with how we're used to going into rooms. I suppose it's a matter of personal choice but the rest of us refer to 'up' as meaning above our heads."

"Then I shall do the same to avoid confusion," said Kerr. "How far up are we? I mean, above the surface of Mars?"

"We orbit at 17,000 kilometres," said Arisha. "We've just left the EVA Base so Engineering is a bit further round."

"I would expect Mars' gravity to have no effect at that height," said Kerr, walking beside her.

"It's small," said Arisha. "I forget the exact figure but the orbiter is subject to a little under 3% of the Martian gravity compared to the surface. That's about 1% of Earth's gravity since Mars' gravity is about a third of Earth's. If you leave something lying around you'll find it'll very slowly drift towards that wall," and she pointed to the Mars-side wall. "In fact, we couldn't orbit if there was no gravity from Mars."

"How so?" asked Kerr as they paused beside the hatch to Engineering.

"This is Engineering," said Arisha, opening the hatch. "Our engineers, Tariq and Shanice, have their quarters on either side. Looks like there's no one here at the moment. Tariq's probably fixed the buffer problem and gone to his quarters as this is his rest period as well but I don't know where Shanice is."

Kerr peered down through the hatch but the room looked much like any engineering workshop anywhere. Tools, monitors, disembowelled pieces of equipment and assorted parts lay everywhere. Three 3D printers, ranging from small to large lined one wall. The apparent disorder verged on the offensive to Kerr but he knew full well from his experience on deep sea rigs that engineers had a different concept of 'order' to everyone else. Undoubtedly Shanice and Tariq knew exactly where everything was. As the orbiter was still in orbit and appeared to

be functioning he presumed they were both quite competent.

“You should know where all staff are at all times,” he said, frowning at Arisha. “In case an emergency arises.”

Arisha looked at him then reached over and tapped the nearest intercom.

“Efren?” she said.

There was a moment's hesitation then the intercom squawked “yes?”

“Where's Shanice?” asked Arisha.

“She's in the stores,” said Efren. “Getting some more resin for the printers.”

“Thanks,” said Arisha, feeling a mild surge of triumph.

“Shanice is in the stores,” she repeated unnecessarily to Kerr.

“Good,” he said. “You were saying?”

“About what?” asked Arisha, momentarily confused.

“About needing gravity to orbit,” said Kerr.

“Ah, yes,” said Arisha and closed the hatch as Kerr showed no sign of wanting to go down inside. “Orbit is achieved by matching the downward pull from gravity with forward speed. If there was no gravity at all then we'd just keep going straight ahead and end up in the middle of the black hole in the centre of the galaxy or something. It's Newton's First Law of Motion in practice. It's analogous to whirling a stone around on a piece of string. If the string, gravity, wasn't there then the stone, us, would just fly away.”

“I see,” said Kerr, thoughtfully.

“It's actually a little more complex than that,” said Arisha as they walked on. “We are in a geo-stationary orbit which is a precisely

calculated orbit that ensures we stay fixed above the same point on the surface at all times.”

“Ahh,” said Kerr. “Presumably directly above the mine?”

“No,” said Arisha. “We’re directly above the equator and the mine is about twelve degrees north and almost a quarter of the way further round Mars. It’s not my field but that gives the optimal flight path for the shuttles coming up from the mine. They need to do two and a quarter circuits of Mars to gain sufficient height to rendezvous with the orbiter.”

“I see,” said Kerr.

“And this is the Gym,” said Arisha, opening the hatch.

Again the room was deserted but it looked much like any other gym with a cycling machine, a rowing machine, a walking machine and various other pieces of exercise equipment. A faint odour wafted up suggesting the gym smelt much like other gyms as well, only not as strongly.

“And the Rec Room,” said Arisha, opening the hatch next door. “Ahh, there’s Arlo. Come on in and I’ll introduce you.”

Arlo had looked up from a TV screen when the hatch opened and he watched with interest as Arisha and Kerr climbed down the ladder. He was a youngish man, in his late twenties, thin and with a decidedly prominent nose that verged on being beaky. He was wearing only a pair of shorts. When they neared the bottom he put down his screen and plate of food and jumped up.

“Hello,” he said with a smile and held out his hand. “You must be Magnus. I heard you’d arrived. I’m Arlo.”

“Kerr,” said Kerr, looking down at Arlo’s bare feet. “I won’t shake hands. I’m still grimy from the trip.”

“Oh right,” said Arlo. “I thought your name was Magnus. Looks like I got it wrong.” He laughed nervously and his prominent Adam’s apple

bobbed up and down as he swallowed.

“He prefers to be called Kerr,” said Arisha drily.

“Are you on duty at the moment, Arlo?” asked Kerr.

“Arlo's in my crew,” said Arisha quickly. “This is our rest period.”

“I see,” said Kerr. “And this is where meals are eaten?”

“Yes,” said Arisha. “We have a small kitchen over there and you prepare whatever you want yourself. We get regular supplies from Earth of the basics but if there's anything in particular you want it can be ordered so long as it can be vacuum packed or frozen.”

“How long does that take?” asked Kerr, walking over to look at the kitchen, leaving Arlo standing there looking a little perplexed. He raised his eyebrows at Arisha and mouthed 'Kerr?'.

“Between two and four days,” said Arisha, giving Arlo a quick little shake of her head. “Usually the supplies are on the next transporter but sometimes they have to get things in themselves.”

“And do you monitor diets?” asked Kerr.

“No,” said Arisha. “I trust people to eat sensibly although I do give everyone a physical every two weeks.”

“I see,” said Kerr, opening the door to a refrigerator and peering inside. He shut the door and turned back.

“This is also our recreation area,” said Arisha. “We have a fairly large library of books, videos and video games as well as a selection of board games.”

“Do you play mahjong, Mag ... ah, Kerr?” asked Arlo. “We need a fourth.”

“Sadly not,” said Kerr. “I prefer chess but I'm not much of a game player.”

“Oh,” said Arlo.

“Well, a pleasure to meet you, Arlo,” said Kerr. “I’m sure we’ll become well acquainted in due course.”

“Oh, yeah,” said Arlo, “and you.”

“Who else is in your, ah, crew?” asked Kerr when they were back in the corridor.

“Arlo,” said Arisha, “Tariq and Zara.”

“Ah, yes, Tariq the Security Officer,” said Kerr. “And my crew?”

“Efren, Rikki and Shanice,” said Arisha. “Shanice is in the stores but Efren and Rikki will be in the Control Centre as they have the duty at the moment. These are your quarters,” and she paused beside a hatch labelled Hugh Lamont. Someone had drawn a thick black line through the name. “Do you want to meet them?”

“Shortly,” said Kerr, studying the name label. He raised an eyebrow but didn’t comment on the line.

“I’ll get Tariq to do a new label,” said Arisha. “What name would you like? Magnus Kerr or just Kerr?”

“I imagine Magnus Kerr would be in keeping with the custom here,” said Kerr. “When is the end of the current shift?”

“In about an hour,” said Arisha. “At midnight.”

“Then could you please have all staff meet me in the Rec Room in an hour for a briefing,” said Kerr.

“That would be difficult,” said Arisha. “Arlo and Zara will have the duty then and they can’t leave the Control Centre as the shuttles need to be monitored continuously.”

“Ahh, yes,” said Kerr. “When is the next period when all staff are free?”

“There isn't one,” said Arisha. “The mine operates continuously, as do the shuttles. We work on twelve hour shifts. There's always one shift on duty.”

“Hmm,” said Kerr thoughtfully. “In that case please have all the staff meet me in the Control Centre at midnight. Those monitoring can continue to monitor and listen to me at the same time which shouldn't be too disruptive. Oh, and tell Arlo to wear something more appropriate. Bare feet are unhygienic.”

Chapter Three

Kerr watched Arisha walk past the Control Centre in the direction of her own quarters. It was disconcerting to see her walking uphill and tilting back towards him yet moving as though she was on the flat due to the curvature of the corridor. Indeed, by the time she'd passed the hatch to the Control Centre only her feet were visible, just under the ceiling of the corridor.

"I imagine I'll get used to it," he thought and turned to press the button for the hatch to his quarters then frowned.

Looking down through the hatch it seemed as if the previous manager, Hugh Lamont, had just left. Some clothing hung over the back of the chair and there were some shorts on the bed. Aside from the view screen, which was still turned on, there were a couple of note pad computers, a plate and a mug on the desk. Several pictures were stuck to the walls and there were a number of ornaments as well as video disks, a model of an 18th century sailing vessel and an incense burner on the shelves.

"Hmph," muttered Kerr and climbed down the ladder. He placed his bag neatly beside the foot of the ladder then went over to the view screen, which was displaying an image of Earth. It wasn't immediately apparent if this was a real-time enlarged view of Earth as seen from the orbiter or a photograph.

"Computer," he said, "status check."

"Operational," said the computer in an androgynous accent free voice although, to Kerr, it sounded slightly more female than male.

"Voice recognition check," said Kerr, glancing inside the mug on the desk. It hadn't been cleaned since last use and there was some mould growing inside. He wrinkled his nose in distaste.

"Please say the words on the screen," said the computer and the image of Earth was replaced by some text.

"Mary had a little lamb and Little Bo Peep has lost his sheep," said

Kerr, picking up one of the note pads. It had turned itself off so he thumbed the power button.

“Voice identified as Magnus Andrew Kerr,” said the computer. “The status of Magnus Andrew Kerr is not known at this location.”

“Refer directive 2083 dash 4113 dash Mars Mining Operation One dash Manager Assignment,” said Kerr, looking at the screen of the note pad. It seemed to contain a number of books which, judging by the titles, seemed to be mainly thrillers and spy novels.

“Please confirm your status,” said the computer.

“Magnus Kerr, Manager, Vanofov Corporation Mars Sub-Surface Mine and Orbiter,” said Kerr, putting the note pad down and picking up the other one. That too had powered off so he thumbed the button.

“Confirmed,” said the computer.

“Set alarm for 23:50 hours,” said Kerr.

“Alarm set,” said the computer.

“Interesting,” said Kerr, looking at the screen of the note pad. A brief message, slowly flashing in red, said “Authorised Access Only”.

He pressed his thumb against the fingerprint reader built in to the back of the note pad. The screen briefly displayed 'Not Authorised' then returned to the flashing red 'Authorised Access Only'.

He turned the note book over to read the manufacturer's label on the back.

“Computer, who is assigned note book serial number AN41332557-TR?” he asked.

“Hugh Raymond Lamont,” said the computer.

“Computer, identify purpose of that note book,” said Kerr.

“Personal use,” said the computer.

“Interesting,” muttered Kerr. “Why would Lamont have a bio-secured note book for personal use? What did he have in there?”

Kerr tapped the note book thoughtfully a few times with his finger then powered it off and walked over to the ladder. Picking up his bag he took it over to the bed and dumped it, putting the note book beside it. Distastefully he picked up the shorts and dropped them on the floor before stripping off the cotton jumpsuit and socks he'd worn under the anti-grav suit. He tossed those on the floor on top of the shorts. He scratched in a few places then rummaged inside his bag for fresh underwear, a clean uniform and a pair of thin soled slip-on shoes. He laid the clothes on the bed then slipped the note book inside the bag and re-sealed it. The waste disposal chute was in the usual place, beside the sanitation unit, so he gathered up the discarded clothes and walked across the room. He stuffed the clothes inside the chute and pressed the button. A faint hiss indicated they'd been whisked away to wherever waste was disposed of. It would be detailed somewhere in the 26,000 pages of the manuals and he'd get to it eventually.

More importantly, the sanitation unit was virtually identical to the one he'd had on the deep sea rig although why the Vanofov Corporation saw fit to install interactive ultrasound body cleansing units on a deep sea rig when there was a virtually unlimited supply of sea water barely metres away as well as an efficient desalination plant was something he'd never fully fathomed. Still, their use on the orbiter was fairly obvious as water was far less readily available. He stepped inside, told it he wanted a full body cleanse then, thirty seconds later, stepped out again, his skin tingling from the effects of being blasted with ultra high frequency sound waves which had scourged his skin and cleaned his teeth. Refreshed, but still a little tired from the after effects of the drugs used on his trip, he got dressed and sat down in the chair to think.

A while later a melodic gong pulsed.

“Your 23:50 alarm call,” said the computer.

“Dismiss,” said Kerr.

With a small sigh he stood up and stretched before retrieving his personal grooming kit from his bag. He combed his hair using the mirror on the side of the sanitation unit then picked up the used mug and plate from the desk before climbing the ladder to the corridor. Unsurprisingly the corridor was deserted so he walked round to the Rec Room which was also deserted. He deposited the plate inside the dishwasher. He'd noticed a discarded knife as well as a couple of plates and mugs on the preparation counter when he'd been there previously with Arisha so he picked up the knife and returned to the corridor. He caught a glimpse of someone heading towards the Control Centre and hesitated, wondering which way to go. Deciding it didn't really matter as the orbiter was so small, he continued past Engineering to the EVA Base and looked inside. The coffin with the discarded anti-grav suit was still there. He nodded then closed the hatch and walked purposefully to the Control Centre.

Seven pairs of eyes watched in silence as he climbed down to face the others. Fully aware of the drama of the situation he slowly turned, mug and knife in hand, and surveyed the room.

It was sparsely furnished. There were two large desks, each with a large view screen, perhaps a metre apart and both facing another view screen which almost filled the entire wall. Some way back from the desks was a swivel chair beside another view screen, this one laid horizontally like a table. Two people sat behind the desks, each at an angle so they could see both Kerr and their screens. One was Arlo Finn. The other was a Chinese girl who Kerr presumed to be Zara Tan. Both were wearing their regulation blue tops with the Vanofov Corporation logo, black trousers and soft soled anti-static shoes. Arrayed around them, all standing as there were no other chairs, were four others also in uniform. Two wore blue tops so they were likely to be Efren Vanick and Rikki Beauvoir as the operations uniform was blue. Arisha had changed from her sari and now wore a gold top, matching Kerr's since they were both managers. The fourth, an attractive black girl with a round face and long braids gathered in a brightly coloured headscarf, wore a red top thus marking her out as Shanice LeBlanc, Engineer. The other person was a tall spare man with an angular face. He was, by elimination, Tariq Shandie the other

engineer. He wore a pair of shorts and a dark green singlet.

Kerr let the silence hang for several seconds, letting the tension build. Then he moved over to stand in front of the swivel chair and carefully placed the mug and knife on the surface of the screen table.

“It is unclear to me whether to wish you all good morning or good evening,” he said turning to look at the group, “so I shall simply say hello.”

Arisha said hello fairly loudly and a couple of others muttered hello. Arlo looked up from his screen and nodded. Zara merely stared at him.

“My name is Kerr,” said Kerr, standing straight with his feet a little apart and his hands clasped behind his back. “As you will doubtless know by now I prefer to be known as Mr Kerr or simply Kerr. I am the manager of the sub-surface mine and this orbiter and I like to see the distinctions of rank preserved.”

He looked at each of the staff in turn, noting who met his eye and who didn't.

“You will also doubtless know by now that I expect uniforms to be worn at all times while on duty and appropriate clothing to be worn when off duty. By appropriate I mean clothing that is not loose enough to catch in any equipment nor provocative in any way. Anti-static footwear will be worn at all times except when you are in bed. No jewellery or personal adornments are to be worn when on duty and when off duty no jewellery or adornments are to be worn which may snag on equipment or cause an electrical disturbance.”

He looked around as he said this, noting people's reactions. There were a couple of mildly antagonistic faces but that was only to be expected.

“You are Shanice LeBlanc?” he asked, looking suddenly at the girl in the headscarf.

“Yes,” she said a trifle nervously, surprised to be identified so soon.

“You are to be commended,” said Kerr. “Your headscarf is an appropriate addition to your uniform in that it keeps your hair under control and is visually stimulating.”

“Oh, umm, thanks,” she said, nervously touching her headscarf. “Umm, Mr Kerr.”

“You are Tariq Shandie?” asked Kerr, shifting his gaze to Tariq who was standing a little to the side of Arisha. He was one of the ones with a little antagonism on his face.

“Yes, that's right,” said Tariq, looking him squarely in the eye.

“Am I correct in thinking that you are currently on duty?” asked Kerr.

“That's right,” said Tariq.

“And yet you are not in uniform,” said Kerr. “Is there a reason for this?”

“It got burnt by acid,” said Tariq. “I threw it away.”

“I see,” said Kerr. “And you do not have another?”

“The engineers' clothing gets soiled very easily,” said Arisha, interjecting. “Their work can be messy at times.”

“I see,” said Kerr. “So your spare uniforms have also been discarded?”

“Yes,” said Tariq, a faint sneer coming to his face.

“That is not acceptable,” said Kerr. He turned to look at the others. “While the rest of you are in uniform I notice that in a few instances some are looking a little worn. I shall order fresh uniforms. Pride in one's appearance is allied to pride in one's performance. An efficient team is also a spotless team and someone who does not take care of their appearance is unlikely to take pride in their work. This also applies to your personal attire when off duty. I trust I make myself clear on this matter?”

There were several nods and a couple of yeses.

“Good,” said Kerr. “Moving on. Closely related to attire is the work environment. Whilst I appreciate that the task of cleaning the work space is undertaken by automated cleaners, I was somewhat dismayed to notice a number of plates left lying around in the Rec Room, together with this,” and he held up the knife. “Moreover, when I returned there some forty minutes later those items had still not been cleared away. Whilst I appreciate that some plates may not seem to be of great importance, this knife is a serious matter. A loose knife is a significant health and safety risk, especially in an environment where things drift due to gravitational influences. Furthermore, a few moments ago I checked the EVA Base and discovered that the DSSLC in which I arrived was still open and my discarded anti-grav suit not disinfected. This is unacceptable. There is a risk of Earth based pathogens mutating in space which could have unfortunate and potentially extreme consequences in a small, contained environment such as this.”

“Ahh,” said Arisha. “I haven't got around to that yet. It's on my list.”

“I appreciate the use of lists,” said Kerr. “They have a useful function but I have not yet finished. When I entered my quarters I was alarmed to discover that not only had Mr Lamont's personal possessions not been packed away in readiness for their return to Earth but that nothing had been done with regard to cleanliness. I found this,” and he held up the mouldy mug. “As you can see it has several days growth of mould inside. Not only is this a health hazard but it is a sign of disrespect to both Mr Lamont in not taking care of his possessions and to me. Surely it is not unreasonable for the new manager to expect his living quarters to be made clean and habitable before he arrives?”

“Shuttle 17 completing second orbit,” said Zara unexpectedly. “Beginning approach manoeuvres.”

“I daresay you're right, Kerr,” said Arisha, “but we were all deeply shocked by Hugh's ... by what happened to Hugh and we, well, when we were told by Central Control on Earth to leave his things pending a decision I think we all, umm, well, we more or less decided to stay

away from his quarters entirely. I apologise for the mouldy mug but it was an oversight.”

“One of many, it seems,” said Kerr. “No matter. I shall attend to Mr Lamont's belongings myself. However, the company psychologist has noted a pattern from Mr Lamont's weekly reports which she considers to be indicative of an increasing decline in morale. I confess my discovery on my arrival here of the flouting of dress codes and general slackness in maintaining a clean and safe environment tends to confirm this. I am therefore, starting this day, implementing a daily inspection of all areas of the orbiter, including personal quarters, to ensure that the environment is maintained in a clean, orderly and safe manner.”

“Um, our quarters?” exclaimed Efren, looking up. He'd been leaning his hip against one of the desks and staring at the floor with his arms folded. “Isn't that an invasion of privacy?”

“I will not be inspecting inside drawers, cupboards and lockers,” said Kerr. “I have no interest in your personal belongings as such but I will be inspecting living spaces to ensure everything is tidied away and that no messes are present. I do not want these,” and he held up the knife and the mug, “to recur.”

“I think you're taking things a bit far,” said Tariq angrily. “We're civilians you know. We're not in the military.”

“I am aware of that,” said Kerr, “but I am the manager of this station and I am responsible for the health and safety of all concerned as well as morale.”

“You think putting things away will help with morale?” asked Shanice.

“Definitely,” said Kerr. “Slipshod care of the environment leads to slipshod work practices and slipshod thinking, errors and mistakes. Smart attire, a clean tidy safe environment and efficiency in your work will lead to improved attitudes and performance. I expect significant improvements, people, very quickly.”

“And what are you going to do if we don't comply with your orders,

Mr Kerr?" said Tariq sarcastically putting emphasis on the 'Mr'.
"Court-martial us?"

"I am disappointed that you see only punishment as a motivator here," said Kerr levelly, looking at him. "Are you not able to do these things for their own intrinsic benefit or do you prefer to wallow in filth?"

"Come on!" exclaimed Tariq. "We're not wallowing in filth!"

"Indeed?" said Kerr. "Perhaps we should discuss this further over a drink. Here, you can use this mug," and he tossed the mouldy mug at Tariq. "Or would you prefer I tossed this dirty knife?"

Tariq caught the mug instinctively and glared at Kerr before looking at the mug.

"Ugh," he said.

"Precisely," said Kerr. "And who knows what is growing inside the anti-grav suit or the DSSLC or in any of the other things left lying around. I will have everything cleaned and stowed away as soon as it is finished with."

"Or else," muttered Tariq.

"Indeed, or else," said Kerr calmly. "It was not my intent to threaten as I had supposed the benefits to be readily apparent but I would remind you that it is within my power to have individuals fined, have seniority docked or even be returned to Earth for reassignment or have contracts terminated."

"Shuttle 19 on final approach," said Zara. "Five thousand metres distant, five hundred metres above. Fully rotated and ready for container release."

"Put it on the main screen Zara," said Arisha, taking the opportunity to calm things down. "This will give you an idea of what we do here, Kerr."

“Good plan,” said Kerr, looking up at the screen as an image of a shuttle appeared. Nothing much seemed to be happening even though the craft was travelling at high speed. It was, however, moving only slightly faster than the orbiter and was going backwards.

“Taking control,” said Arlo, watching his screen closely. “Three, two, one,” and his hand jerked. “I have it.”

“You have it,” confirmed Zara, letting go of her spatial control and sitting back.

“Why's the shuttle high?” asked Kerr.

“It's because we need to bring it to the end of the container chain,” said Rikki, “which means it has to be in a higher orbit.”

“Explain,” said Kerr, glancing at her.

She was leaning against the wall, fiddling with her fingernails and not overly interested in what was happening on the screen. After all, she and Efren controlled around fifty shuttles a shift when they had the duty and it was old hat.

“You can't go directly up or down when in orbit,” she said, wondering why Kerr didn't already know these things. “That's because speed is balanced against gravity so if you want to go to a higher orbit you have to go faster and if you want to go lower you go slower. You can only make tiny adjustments with the directional thrusters and you have to be careful you don't overdo them.”

“Interesting,” said Kerr, watching the screen as the tail end of the chain of containers appeared on the left of the screen. The shuttle, to the right of centre screen, was visibly dropping. A row of numbers across the top of the screen showed the speed and position of the shuttle relative to both the orbiter and the container chain. The lack of sound made the images almost surreal. The shuttle edged a little closer to the last container as Arlo manipulated his spatial control, manoeuvring the movement of the shuttle to the nearest millimetre. Tiny flashes appeared on the sides of the shuttle as he made precise adjustments with the directional thrusters.

“In position,” he said after a few moments. “Container release in three, two, one ...” Nothing happened for a couple of moments then the main engines of the shuttle fired, sending a stream of exhaust towards the container chain. Then, slowly, but with reducing speed, the shuttle started to move away from the container, drifting backwards and down. In the process the shuttle revealed itself to be essentially two long prongs attached to an aerodynamically shaped cuboid. The cuboid contained the control system and the prongs with the primary thrusters held the container between them. By dropping back and down the shuttle left the container in position but was itself able to move clear.

“Container release complete,” said Arlo, rotating the shuttle again. “Returning to base.”

“Positioning tug,” said Zara, sitting back up and putting her hand on her spatial control.

“Tug?” asked Kerr.

“A small tug does the final connecting of the container to the chain,” said Arisha.

“Interesting,” said Kerr, nodding. He raised his voice slightly. “OK, people. Thank you for your attendance. I trust my primary goal on the orbiter is clear, which is to improve efficiency and morale. You should also be aware that I shall, in the next twenty four hours, be holding a similar briefing with the mining staff with a view to increasing production, reducing the number of machine failures and also improving morale. Tariq, a word with you before you depart if I may.”

As Efren, Rikki and Shanice started to climb the ladder, Arisha came over to stand next to Kerr.

“I’ll deal with the coffin and anti-grav suit now,” she said. “I apologise for not attending to it earlier.”

“Good,” said Kerr. “Am I correct in thinking my team is now off duty?”

“That's right,” said Arisha.

“I might get some sleep then,” said Kerr. “Perhaps in the morning we could get together to discuss the, ahh, demise of Hugh Lamont?”

Chapter Four

“Ah, Tariq,” said Kerr as Arisha turned away to leave. She paused by the ladder just in case as she sensed an element of friction between Kerr and Tariq.

“Just something to help my understanding,” said Kerr. “You are responsible for security as well as engineering, yes?”

“That's right,” said Tariq. His head and beard were closely cropped to only a couple of millimetres which gave his almond shaped face a forlorn look.

“I'm curious why you weren't in the medical centre when I arrived,” said Kerr. “Surely the arrival of a stranger would be a security matter?”

Tariq snorted.

“Not at all,” he said. “You would have been fully screened before getting into the coffin and Arisha would have noticed from the bio-data if you'd been swapped for someone else during transfer. You may be a security risk for all I know but you're a Head Office approved security risk so it's not my concern.”

“Fair point,” said Kerr. “So what security issues would concern you?”

“Primarily systems security,” said Tariq, “and also freighter security. The Chinese would love to get their hands on our technology.”

“How are the Chinese involved?” asked Kerr with a frown.

“You seriously don't know?” exclaimed Tariq, raising his eyebrows.

“My background is deep sea drilling,” said Kerr. “I had only a superficial briefing when given this assignment. Enlighten me.”

“We are not the only operation on Mars,” said Arisha, coming back over to join them. “There are two others, run by Chinese and African corporations. Zhongguo Kantan Kaifa Gongsī runs the bigger of the

two and the other is Sayari Resource Development who only mine precious stones.”

“Yes, I've heard of Kantan Kaifa and SRD,” said Kerr. “In what way are they a threat?”

“Primarily because of the antimatter-catalysed nuclear pulse propulsion on the freighters,” said Tariq. “It's proprietary to Vanofov although Kantan Kaifa are developing their own version but they're three, perhaps four years behind. Theoretically ACNPP could achieve speeds as high as 3% of the speed of light although our system at the moment can only get up to around 0.35% which is why it took you about two days to get here and the freighters about nine days to return under load. Kantan Kaifa are still in the early development stage and can barely achieve a tenth of what we can which is an issue for them as their production rate is similar to ours.”

“I see,” said Kerr thoughtfully. “So their freighters take 90 days for the return trip?”

“Or longer,” said Tariq, “and they're struggling with consistency in producing the antimatter pellets which have to be between 98 and 100 milligrams as well as containment. Antimatter is a bugger to work with.”

“So I understand,” said Kerr. “So, if I understand you correctly, they need approximately ten times the number of freighters as we do and, presumably, have higher freighter losses?”

“Exactly,” said Arisha. “Which means their overall costs are considerably higher and as a result they're less competitive.”

“Indeed,” said Kerr. “So, Tariq, you're mainly concerned with making sure no one gets into our computer systems?”

“That's right,” said Tariq. “Not just the data, of course. We also need to ensure that the automated equipment on the ground doesn't receive anomalous signals. There have been a few intrusion attempts but nothing significant as yet.”

“When you say 'intrusion attempts',” said Kerr, “what do you mean by that?”

“As far as I can tell,” said Tariq, “there have been several attempts to gain access to our computer systems by what appears to be Kantan Kaifa which were blocked. It's possible that those were by the Americans but what traces were left behind looked to be more the work of the Chinese. There've also been two attempts on the mine itself that originated with SRD and appeared to be aimed at breaking into our store of precious stones.”

“Americans?” asked Kerr, raising his eyebrows. “Didn't you say only the Chinese and Africans had operations here?”

“There is a rumour than an American mining consortium is currently raising funding for a mining operation on Mars,” said Tariq, “although it will be a few years before it's underway as they don't have any infrastructure as yet. That said, they could be trying to infiltrate our freighter systems with a view to building that infrastructure but it would make more sense to target our research labs on Earth.”

“Have you reported this to Head Office?” asked Kerr.

“I reported the intrusion attempts to Hugh and Arisha,” said Tariq.

“And we reported them to Earth,” said Arisha.

“Good,” said Kerr. “When you say SRD tried to break into the precious stone store what do you mean? There was a physical attack on the mine?”

“Oh no,” said Tariq. “Both were attempts to bypass normal shipment containers so that a shuttle would pick up the precious stone container instead. Presumably if that had been successful the shuttle would have been directed to some other location on Mars, the stones container removed and the shuttle destroyed or possibly hidden in some way.”

“Why do we store the precious stones separately?” asked Kerr.

“They’re rare,” said Arisha. “When precious stones are spotted they’re separated out and put into a container set aside for that purpose. I’m not entirely sure why but it’s something to do with not contaminating the processes by which the various metals and so on are isolated. Regardless, it takes a long time to fill a container with precious stones. The last shipment was, ohh, five months ago and the current one is around three quarters full. Mind you, even 75 tons of precious stones would supplement SRD’s operation substantially. It doesn’t help that SRD’s propulsion is still completely nuclear and it takes six months for their freighters to reach Earth. An additional mid-cycle injection of 75 tons of precious stones would have major cash-flow benefits for the company.”

“Yes, I appreciate that,” said Kerr. “Thank you both for that information. And, Tariq, as I said, I’m just trying to understand what goes on here. I wasn’t doubting your efficiency.”

“I completely understand, Kerr,” said Tariq. “Taking over an entire off-Earth mining operation must be a big challenge when you’ve no experience.”

“Indeed,” said Kerr, wondering if Tariq was having a dig at him, not that it mattered so long as it didn’t turn into outright hostility and sub-optimal performance.

“Do you need me anymore?” asked Tariq.

“That will be all for now,” said Kerr.

Tariq gave a peremptory nod then headed for the ladder. Arisha hesitated then followed.

“Oh, one more thing,” said Kerr. They both turned to look at him. “In the event of a direct physical attack on the mine what weaponry do we have?”

Tariq snorted.

“This is Mars,” he said. “No one’s going to launch a physical attack here. Aside from the low gravity, thin atmosphere and dust storms the

mine's underground. It would be more effective to take control of systems and divert the shuttles. Anyway, if there was going to be an attack it would make more sense to target the orbiter but again, taking over the systems would be more effective than a shoot-out. All they'd need to do is shut down the environmental controls and let us suffocate."

"Excellent," said Kerr. "I wasn't happy with the idea of weaponry. Good. Ah, one last question. Where would I find a container for Mr Lamont's belongings?"

"There'll be some empty containers in the stores," said Arisha. "I'll get one for you."

"I'll do it," said Tariq. "I'm going to the stores anyway."

"I'll come with you," said Kerr. "I want to visit the core."

Out of politeness, Arisha stood back so Kerr could go up the ladder first. Tariq smirked but let Arisha follow. As they disappeared through the hatch, Arlo and Zara glanced at each other.

"So what do you think?" asked Zara quietly.

"Bit of a dictator," replied Arlo just as quietly. "But maybe he will be able to change things around here."

"He scares me," said Zara, glancing up at the now closed hatch.

"Oh there's nothing to worry about," said Arlo. "Just keep calling him Mr Kerr and kiss his arse and you'll be fine. I've met his type before."

"Kiss his arse?" exclaimed Zara in alarm. "I do not want to kiss his arse! He can't make me can he?"

Arlo laughed. "It's just a metaphor, an idiom," he said. "It means always being nice and agreeing with him. I'm sure you have a similar saying in China."

"Good," said Zara, frowning. "I am not kissing anyone's arses. What is

an arse anyway?”

“Oh, it's their bottom,” said Arlo, pointing to his own.

“I would not be liking that,” said Zara, looking disgusted. “Most definitely I am not kissing those. And what is an idiom?”

“Ah, you've got me there,” said Arlo, pursing his lips. “You know I'm not really entirely sure but I think it's something that isn't meant to mean what it literally means.”

“Oh,” said Zara and thought for a moment. “You mean like bá miáo zhù zhǎng?”

“What does that mean?” asked Arlo, checking his screen.

“It literally means pulling up seedlings to help them grow,” said Zara, “but we say it to mean someone's acting hastily and ruining everything.”

“Umm, I think so,” said Arlo, looking a little confused. “Well, probably. Maybe.”

“I'll be in the EVA Base if you need me,” said Arisha, up in the corridor.

“Thank you,” said Kerr, looking expectantly at Tariq.

“The stores are in the Central Core,” said Tariq, opening the hatch in the ceiling to reveal a square tunnel a metre and a half across. A series of handholds were recessed in two sides. “We have to climb but it's weightless most of the way.”

He jumped up and caught the lowest of the handholds then pulled himself in. Kerr looked at the ladder on the wall beside the hatch then jumped up as well.

“My understanding is that the core contains the nuclear reactor, computer and store rooms,” he said, following Tariq up the short tunnel. “Where is the antimatter stored?”

“There isn't any,” said Tariq, opening another hatch at the end of the tunnel. “The orbiter is powered by conventional nuclear fission. Only the freighters use the antimatter and that's replenished from Earth.”

“Right,” said Kerr. “And the shuttles?”

“They're chemically fuelled,” said Tariq. “Hydrazine. It's more cost effective as it's manufactured in the mine directly and the shuttles don't need the higher speeds as they have to contend with Mars' atmosphere.”

“I see,” said Kerr.

“This is the Consumables Store,” said Tariq as they emerged into a small room filled with racks of crates. “The Engineering Store is up there,” and he pointed to a circular hole.

“Where's the reactor?” asked Kerr.

“Beyond the Engineering Store,” said Tariq, “and the Computer Centre is down there.”

He pointed to another hole.

“Isn't it somewhat dangerous to have the reactor so close?” asked Kerr.

“It's completely sealed and shielded,” said Tariq, starting to pull crates out and looking inside.

“What if there's a problem and repairs are needed?” asked Kerr.

“There are some remote controlled systems inside which Shanice and I can use from Engineering to fix minor issues,” said Tariq. “Ah hah! This one's empty.”

“And if there's a major problem” asked Kerr.

“No one will be left to care,” said Tariq. He used his hands to twist himself around so he could grin wolfishly at Kerr. “Pouf!” He flung his arms out expressively and floated backwards to knock against more

crates.

“Hmm,” said Kerr, frowning.

“Don't worry,” said Tariq, pulling himself back. “There are fail-safe mechanisms in place so in the event of a problem such as the core overheating the reactant separates and shuts the reactor down.”

“Which presumably means we then have no power?” asked Kerr.

“The orbiter actually runs off batteries,” said Tariq, “which are continuously being charged by the reactor. If the reactor shuts down we have about twenty hours of battery life in which to fix the problem.”

“And if the problem can't be fixed in time?” asked Kerr.

“We go down to the mine,” said Tariq. “There's a shuttle coming up every fifteen minutes or so and they've the capacity for one passenger so we can all get out in a couple of hours. Worst case scenario all of us, including the six on Mars, can be evacuated back to Earth in a week as there's a freighter leaving every day. I wouldn't want that decision on my record though,” and he grinned at Kerr again.

“I imagine it would be an easy decision to make,” said Kerr, grabbing the crate that floated in the air. “And would be a decision based on engineering advice.”

“I suppose,” said Tariq. “Will the one crate be enough?”

“I expect so,” said Kerr. “I know where to find another if I need one.”

“Great,” said Tariq. He gently pushed himself towards the hole leading to the Engineering Store. “Find your own way back?”

“Yes,” said Kerr. “Thank you for your assistance.”

He watched Tariq waft through the hole then pushed the crate back through the tunnel. It was a little awkward to manoeuvre as the crate fitted with little room to spare and the further along he went the

heavier it got. Still, it was made of aluminium and wasn't particularly heavy even under full gravity.

Back in his quarters, Kerr deposited the crate on the floor and looked around. He sighed then unclipped the lid. Starting with the closet, he took out all of Hugh Lamont's clothes, checking the pockets in case anything had been left inside and feeling for any concealed pouches. He didn't find anything. Taking the pile of clothes to the sanitation unit he hung the clothes inside, two items at a time, and instructed the unit to 'clean clothing'. He folded each item neatly after it had been cleaned and left them stacked on the table. Then he inspected the four pairs of shoes in the closet and again found no hidden compartments. He wasn't really expecting to find any but one of his assigned objectives was to investigate Lamont's death for anything suspicious and the possibility existed, however faint, that Lamont had been involved in something nefarious. He cleaned the shoes in the sanitation unit then placed them at the bottom of the crate with a layer of clothes on top. For some reason three of the pairs of shoes were black anti-static and one was dark green with ordinary soles. Kerr was by no means a fashionista but Lamont didn't have any clothes that seemed to go with the green shoes.

"Perhaps he just liked green," he thought and dismissed the shoes.

Then he went through Lamont's collection of video disks and books, checking each with the computer in case there were any extraneous hidden files. There weren't. He went through all of Lamont's possessions systematically, even prising the top deck off the model sailing ship to see if there was anything inside. Unsurprisingly there wasn't. Each item he put inside the crate after inspecting it then neatly placed the remaining clothes on top. By this stage the crate was almost full. All that remained was the secured personal note book which was still inside Kerr's own bag.

He took it out of the bag and turned it thoughtfully over and over in his hands. Again he powered it up and tried each of his fingers and thumbs on the fingerprint pad with little expectation that any would work. It's best to try the easy things first though as there was a remote possibility that one of Lamont's fingers had a similar print to one of his own. It was not to be, however, and he put the note book on the

table and stared at it for a while.

“Computer,” he said. “Ascertain access protocols for note book,” and he checked the number on the back, “AN41332557-TR.”

“Unknown protocols,” replied the computer after about fifteen seconds.

“Hmm,” muttered Kerr. “Unknown protocols. Why would he secure it with non standard protocols?”

“Computer,” he said as a thought struck him. “Ascertain access protocols for note book AN41332557-TR using Chinese filter.”

“Unknown protocols,” replied the computer after about forty seconds.

“Computer, repeat using African filter,” said Kerr.

“Unknown protocols,” replied the computer after about twenty five seconds.

“OK, so he probably wasn't working for either of them then,” he thought. “Now what?”

Nothing immediately came to mind so he put the note book back in his bag for later consideration. Then he sat down on the edge of the bed. The drugs that had been used to induce the comatose state for his journey were yet to fully wear off and he felt drained.

“Computer, time?” he asked, stifling a yawn.

“01:12,” said the computer.

“Computer, set alarm 09:00,” he said and pulled off his top. “I can't be bothered to think about all this anymore. Computer, set lights and temperature to sleep settings.”

The lights dimmed and a waft of cooler air swept through the room. He stripped off the rest of his clothing and retrieved a pair of sleeping shorts from his bag.

“Tomorrow’s another day,” he muttered as he stretched out on the bed. “Is Tariq going to become a problem? Hmm.”

Chapter Five

Kerr felt as though he was being slowly but inexorably pulled back through darkness then a soft melodious gong started somewhere in the distance.

“Your 09:00 alarm call,” said a familiar voice.

“Just let me sleep, Kirsty, OK?” he muttered, or at least thought he muttered. The blackness surrounding him became dark grey but remained featureless.

“Your 09:00 alarm call,” said the voice again fifteen seconds later. It was noticeably louder this time.

Kerr's eyes snapped open then his body jerked in an instinctive amygdala reaction to his unfamiliar surroundings. Moments later his higher brain functions took over and recognised the place.

“Right,” he muttered. “The orbiter.”

“Your 09:00 alarm call,” said the voice fifteen more seconds later, even louder. It seemed to have acquired an accusatory tone as well. Not unlike that of Kirsty when she was in a mood.

“Dismiss,” said Kerr and wiped his face with his hands.

He took a couple of deep breaths then sat up, swinging his legs over the side of the bed. He looked around then groaned. He felt quite sad for some reason which was unusual. Generally his disciplined mind kept his emotions under tight control.

“Jesus,” he muttered. “Why am I thinking about Kirsty? I haven't thought of her for, what, twenty, twenty five years?”

He briefly thought of putting through an enquiry to find out what had happened to her in the intervening years then dismissed the idea when he found he couldn't remember her last name. In fact he wasn't entirely sure he'd ever known her last name. It might have been Townsend but he had a vague feeling that the name Elaine associated

more with Townsend, not Kirsty although he couldn't remember a girlfriend called Elaine Townsend. Perhaps she'd been a friend of a friend. He shook his head and dismissed the girls. They were in the distant past and he was on the orbiter and had the future to think about.

He made use of the sanitation unit then pulled on a clean uniform. He hadn't eaten or drunk anything since being restored to consciousness after his journey in the freighter and his metabolism was telling him the nutrients supplied to his body during the trip had been depleted and a resupply would be beneficial. Or, to put it another way, he was hungry and thirsty.

He climbed the ladder to the corridor, aware of an ache in his thigh and abdomen muscles. The lighter gravity in the corridor helped and he hesitated before remembering the Rec Room was off to the right. He hesitated again outside the hatch to the Rec Room then carried on to the EVA Base. Opening the hatch, he could see the coffin was neatly stowed on its rack, above another one. Just to be sure he climbed down and went over to the Anti-Grav Suits locker. Presumably the one he'd used was one of the four inside but, just to be certain he sniffed them all. The one at the end still smelt of disinfectant. He gave a slight nod of approval then returned to the Rec Room.

"Hello," said Efren, looking up from a tablet as Kerr climbed down.

"Hello," said Kerr.

"Sleep well?" asked Efren.

"Yes," said Kerr. "This is your rest period?"

"Yes," said Efren. "I'm in your crew."

"Ah yes," said Kerr. "I am not as yet wholly familiar with the arrangements. You have slept?"

"Yup," said Efren.

“Good,” said Kerr. “Please explain the catering system to me.” He glanced over at the kitchen area and was pleased to see nothing was left out.

“Sure,” said Efren. He put the tablet down and jumped up.

“Over here's the kitchen,” he said, walking to the corner of the room with a counter and various appliances. “All the food and drinks are in either the refrigerator or the cupboard, depending on whether they're frozen or dried,” and he opened both to show Kerr the racks of silver packages in both appliances. “They're all labelled, most of the time anyway. There are some at the back without labels so if you're feeling adventurous give one a try. Could be anything. Last time I tried one it was dried sardines on toast and was disgusting.”

“I see,” said Kerr, scanning the label and frowning. “Why are there foodstuffs with no labels?”

“Most probably a stuff up in manufacturing,” said Efren. “Hugh complained but nothing changed so we've learnt to live with it.”

“Then likely it is time for another complaint,” said Kerr. “I will not have my staff's needs ignored.”

“Good luck,” said Efren with a grin. “They're a long way away. So, grab what you fancy,” and he opened another cupboard, “and put it in one of the bowls. If it needs heating chuck it in the microwave,” and he tapped a large glass-fronted oven.

“How long for?” asked Kerr, selecting a packet from the cupboard. It was labelled 'Bacon And Eggs One (l) Portion'.

“It says on the back,” said Efren. “Usually.”

Kerr turned the packet over and sure enough another label said 'Add 200ml water. Microwave Level 4 for 120 seconds.’

“Where's the water?” he asked.

“Here,” said Efren, pointing to a spout with two buttons beside it.

“Red's for hot water and blue for cold. Each time you push a button you get 100ml of water.”

“I see,” said Kerr. He picked up one of the flatter bowls then ripped the top off the packet. Inside were two rather unpleasant looking strips of dried bacon and two blobs of something yellowy white. He tipped them into the bowl and Efren stepped back as he put the bowl under the spout. He pressed the blue button twice and some water squirted into the bowl.

“Press it again,” said Efren. “You need to pause between presses.”

“Ahh,” said Kerr and pressed the button again. He studied the front of the microwave then put the bacon and eggs inside for two minutes. “And beverages?”

“Left side of the cupboard,” said Efren. “They're all 100ml so if you want more take two or three.”

Kerr selected two sachets labelled 'Coffee Black Unsweetened' and Efren passed him a mug from the bowl cupboard.

“Use the hot water and only give it 15 seconds per hundred mil,” said Efren. “Utensils are in that drawer.”

“Right,” said Kerr, opening the drawer. “Who keeps the refrigerator and cupboard stocked?” He took out a knife and fork.

“Usually someone who's off-duty,” said Efren. “If you notice some things are running low you go and get some more.”

“So there is no specific responsibility assigned?” asked Kerr as the microwave pinged. He took his food out and inspected it – it looked a lot better re-hydrated – then he put in his mug.

“No,” said Efren. “We all eat the stuff so we all fetch more.”

“Understandable,” said Kerr. “And who is responsible for ordering fresh supplies?”

“You are,” said Efren. “At least, Arisha usually makes out the order and you authorise it.”

“Excellent,” said Kerr. “Am I distracting you from anything?”

“Nothing important,” said Efren. “I was just catching up on the news from Earth. Is there anything I can help you with?”

“Yes,” said Kerr, taking his breakfast over to the table. “You could give me an overview of your role here.”

“Sure,” said Efren, sitting down next to Kerr. “Someone told me you're from deep sea rigs, is that right?”

“Yes,” said Kerr. “Drilling.”

“Well, what we do here isn't that much different,” said Efren. “The guys in the mine down there are continuously mining, more or less non stop. Pretty much everything they extract gets put into containers and the containers are sent up here by shuttle where we string them together and send them on to Earth. The guys at the mine get the containers to the shuttle pad and onto a shuttle then hand over to me and Rikki, and Arlo and Zara on the other shift. It's our job to bring the shuttles up to the orbiter, make the chains and dispatch them. We also take the returned containers back down to the mine to be refilled.”

“That doesn't seem particularly onerous,” said Kerr. “Why does it need two of you per shift?”

Efren laughed.

“Scale,” he said. “The mine is capable of extracting up to 120,000 tonnes every twenty four hours although generally it's around 100,000 tonnes. Each container has a capacity of 1000 tonnes so they're having to be brought up every fifteen minutes or so. Depending on the weather it takes around two and a half hours to get a shuttle from the ground to the orbiter so that means there are ten or so shuttles flying up at any point in time plus around the same number going back down with an empty container. Me and Rikki have to track and

control all of them as well as manoeuvring the containers onto and off the chains and dealing with the freighters. Fortunately there are usually only two freighters a day, one coming one going. There's a lot to keep track of."

"I see," said Kerr, tucking into his breakfast. "So does one of you handle the upcoming traffic and the other the down traffic?"

"Not really," said Efren. "Whichever of us is free when a shuttle's ready takes control of it. It can get a bit chaotic otherwise, especially with the weather and Phobos."

"Explain," said Kerr, looking up at Efren.

"Phobos is one of Mars' moons," said Efren. "The other is Deimos but Phobos orbits at 9400km which is below us so we have to make sure we stay well away from it since it's a 22km wide lump of rock. The weather's the bigger problem though. Some of the dust storms can be a few thousand kilometres wide which often means changing flight paths dramatically to minimise flight time through one. The dust's incredibly fine and clogs up everything so the less time spent in one the better."

"Wouldn't it be better to just ground the shuttles until the storm's passed?" asked Kerr.

"Simply not possible," said Efren, shaking his head. "They can last for weeks, even months and there's no way we can halt production for that long. Head Office would be having hysterics."

"I see," said Kerr, pursing his lips. "This operation is a lot more complex than I had imagined."

"Tell me about it," said Efren, grinning. "And, if something does go badly wrong, which fortunately it rarely does, we can't even just hit a pause button. We can stop shuttles taking off but there'll still be two and a half hours worth of shuttles in transit to process before we can stop to sort the problem."

"So what sort of problems do you have?" asked Kerr, sitting back and

tasting his coffee. It was OK, not great but OK.

“Mostly minor things which can be fixed by our engineers or the ones on the ground,” said Efren. “We’ve had a couple of instances of fuel leakages which caused explosions but fortunately neither time was the shuttle on the ground or near the orbiter. The most common problem we have is a container coming loose because of dust in the locking mechanism but that’s easily sorted. We just leave the container in orbit and pick it up again later. Only once did a container come loose at low altitude and crash.”

“No one was injured or killed?” asked Kerr.

“Nope,” said Efren. “Virtually everything is either automated or remotely controlled for that reason.”

Kerr nodded thoughtfully and sipped his coffee. Efren watched him, wondering what he was thinking.

“There were no containers attached to the freighter I arrived on,” he said after a while.

“That’s because you were on board,” said Efren. “The company wanted you here in two days rather than the three and a half for a load of empties.”

“So will that mean that the mine will be short on containers?” asked Kerr.

“No,” said Efren. “They’ll just add another twenty to the next five loads. That’ll make things a little more difficult for us in getting them down to the surface but we’ll cope.”

“I’m sure you will,” said Kerr. “How long have you been up here?”

“Nearly eighteen months,” said Efren. “Only six more months to go. Same with Zara. Rikki and Arlo have only been here six months.”

“That makes sense,” said Kerr. “Pairing an experienced operator with a newcomer. Are the engineers on two year tours as well?”

“Yes,” said Efren. “Tariq's been here eighteen months as well and Shanice six. Umm, how long will you be here? Two years?”

“I would doubt that very much,” said Kerr. “I am only here for the interim. A more experienced manager will be assigned in due course.”

“So, if you don't mind me asking,” said Efren cautiously, “why send you rather than wait a little longer for another manager?”

“I have some specific objectives to achieve,” said Kerr.

“You mean like improving morale?” asked Efren.

“Amongst other things,” said Kerr. “Tell me, how do I get down to the mine?”

“Just let one of us know when you're going and we'll put you on a shuttle,” said Efren. “When do you want to go?”

“I need to liaise with Kataline Murchison, the Mine Supervisor,” said Kerr. “Umm, what are the mechanics of putting me on a shuttle?”

“You put on an EVA suit,” said Efren, “and a jet pack and fly over.”

“Ahh,” said Kerr. “I've never used a jet pack. Are they difficult to operate?”

“In that case it's probably best if one of us carries you over to the shuttle with the EVA pod,” said Efren, “since you probably won't be here long enough to warrant learning to use a jet pack. They need a delicate touch and take a little getting used to. Don't want you flying off into the Sun, do we,” and he laughed.

“That would seem a sensible solution,” said Kerr, relieved. The complexities of using an unfamiliar jet pack in a smallish volume of space occupied by shuttles, chains of containers and quite possibly a freighter or two with the only land some 17,000 kilometres below didn't appeal. It would be similar, at least conceptually, to learning to swim in a dock full of tankers and speed boats.

The hatch above hissed open and they both looked up.

“Ahh, there you are,” said Arisha, peering down. “I looked in on you in your quarters and the computer told me you were here. How do you feel? Sleep well?” She slid down the ladder with the ease of experience.

“I slept very well,” said Kerr.

“No dizziness? No aches or pains? No ill effects?” she asked.

“I did experience some aching in my legs and belly,” said Kerr.

“That’ll be from the anti-grav suit,” said Arisha. “Do you still ache?”

“I read a book on anti-grav once,” said Efren. “I couldn’t put it down.”

Kerr and Arisha both just looked at him expressionlessly.

“In fact I found it uplifting,” said Efren, matching their lack of expressions.

“Thank you for that, Efren,” said Arisha drily. “Shouldn’t you be doing your exercises?”

“I was helping Kerr come to terms with his existence here,” said Efren, getting up, “but I know when I’m not wanted.”

“You surprise me,” said Arisha. “The rest of us thought you never noticed.”

“Oh ha bloody ha,” said Efren. “I know you love me really.” He put his foot on the third rung of the ladder and jumped up to the hatch.

“I prefer to discourage over-familiarity with staff,” said Kerr when Efren had disappeared.

“Different managerial styles,” said Arisha. “I’m inclined to think a little humour is useful in a small isolated community but, as you say,

morale is down and was before the, ahh, Hugh incident.”

“Are you free to talk now?” asked Kerr, “or are you needed back in the Control Centre?”

Arisha sighed.

“No, Arlo and Zara have everything under control,” she said. “Things are a little light at the moment as there are no containers to go back down.”

“Yes, Efren was explaining that to me,” said Kerr. “When's the next freighter due from Earth?”

“In about five hours,” said Arisha. “It left before you did but it's taking longer.”

“So I understand,” said Kerr. “Now, correct me if I'm wrong but Hugh Lamont was expelled out of the EVA Base when the external door was opened. Yes?”

Arisha sighed again.

“Yes,” she said. “That's right.”

“And you attribute that to suicide?” asked Kerr.

“It's the only explanation I can think of,” said Arisha. “He had no reason to go EVA at that time and when the computer reported the opening of the external door we were able to pick him up visually on the view screen quite quickly. We immediately went to prepare the pod to go and get him and it was only then that we discovered none of the EVA suits were missing. Both Tariq and Shanice checked the external door controls and safety mechanisms and found nothing wrong. Furthermore, according to the logs, the internal hatch was opened and closed some twenty seven seconds before the external door was triggered which suggests he made no attempt to put on an EVA suit nor reduce the atmospheric pressure inside the EVA Base. Protocols require that to happen in order to prevent explosive decompression.”

“Is there not some mechanism to prevent the external door being opened while there is still air inside the EVA Base?” asked Kerr, frowning.

“Yes,” said Arisha, “but that was manually overridden using his managerial authority. He overrode it, according to the logs, eleven seconds after closing the hatch.”

“And could this have been done from outside the EVA Base?” asked Kerr.

“Of course,” said Arisha. “Virtually everything in the orbiter can be controlled from the Control Centre and it's entirely possible someone else knew Hugh's authorisation codes. But, before you start wondering if it was murder, the logs also show the overriding of the decompression and the opening of the external door were done from the EVA Base, not the Control Centre. I can't see any way of this happening other than for Hugh to have done it himself. Also, ...” and she petered out.

“Also ...?” prompted Kerr.

“Well, I did wonder,” said Arisha, picking up Kerr's fork and toying with it. “I mean, if he wanted to kill himself, why not just evacuate the air from the Base and asphyxiate himself? Why open the external door? It seemed ... superfluous, unnecessary.”

“And did you think of any reason?” asked Kerr.

“Yes,” said Arisha, staring at the tines of the fork. Then she looked at Kerr. “It was the guarantee, you see. If he just evacuated the air we might have been able to save him but by opening the door with full pressure he was sucked out into space. He was over two kilometres away when we found him on screen. He would have been long dead by then. In fact it's fortunate he didn't get smashed into a container or shuttle. That would have been messy.”

Chapter Six

“I see,” said Kerr. “I’m going to get some more food. Can I get you anything?”

“Ohh, I think some tea,” said Arisha, putting the fork back on the dish. “Thank you.”

“Any particular kind?” asked Kerr, standing up.

“Assam, please,” said Arisha. She sighed and sat back in her chair.

Kerr got himself another serving of bacon and eggs and set it in the microwave then rummaged through the drinks sachets until he found some Assam tea. He made himself another coffee and returned to the table.

“It is possible,” he said, sitting down and passing the tea to Arisha, “that someone was already in the EVA Base wearing an EVA suit. When Hugh entered, this person either overrode the manual decompression using Hugh’s authorisation or forced Hugh to do it then opened the external door.”

“You seem determined to see this as murder,” said Arisha, watching him over the tea mug.

“No,” said Kerr. “I’m merely working through all possible explanations. Your thoughts?”

Arisha closed her eyes for a few moments then grimaced.

“I suppose it is possible,” she said after a few moments, “although it seems unlikely. The timings suggest Hugh wasn’t forced though. It would take more than eleven seconds to force someone to do something and, after all, he was the manager and he’d demand some sort of explanation at the very least.”

“Were there any signs of a struggle?” asked Kerr.

“Impossible to say,” said Arisha. “There was explosive decompression.

Anything that wasn't locked down was vented into space. And another thing, if someone did do this they'd have had to remove the EVA suit and return it to its housing in a vacuum and then get out through the hatch without venting the air in the corridor."

"You checked the suits were all accounted for?" asked Kerr.

"Absolutely," said Arisha. "And they were all in their housings." She sipped her tea then a small frown crossed her face.

"You've thought of something," said Kerr, watching her as he ate.

"Not really," said Arisha. "I was just remembering the sequence of events. When the alarm went off I was in the Control Centre with Zara and Arlo. I closed the external door then called Shanice to meet me at the EVA Base hatch so she could check the systems before re-pressurising. Then we went inside and powered up the pod while we got two suits out. That's when I noticed there were none missing."

"So if someone had done this they'd have had to close the external door, re-pressurise, remove the suit, get out of the EVA Base, depressurise it again and re-open the external door before you and Shanice got there and without any of that being logged," said Kerr. "I think we can reasonably dismiss that scenario as a possibility. There is however another possibility"

"Go on," said Arisha, her tone a curious mixture of exasperation and weariness.

"Someone from the mine came up in a shuttle," said Kerr. "They'd already be in an EVA suit and could get back in the shuttle immediately after opening the EVA Base door without having to shut the door, re-pressurise and so on."

Arisha just stared at him incredulously.

"Then again," said Kerr, pulling on his chin, "that person would either have to hang around outside the orbiter on the off-chance Hugh would go to the EVA Base or a meeting had been pre-arranged."

“You do realise that the movements of the shuttles are constantly monitored,” said Arisha, frowning at him, “so this person would have been spotted almost instantly. Besides, the logs show the external door was opened from inside the EVA Base not remotely from outside the orbiter and that's to say nothing of the five hour trip up and back. Their absence would have been noticed.”

“Well, there is that,” said Kerr. “Perhaps not.”

“Quite,” said Arisha. “So we're back to suicide.”

“That would seem to be the case,” said Kerr. “Where was Shanice when you called her?”

“In Engineering,” said Arisha.

“You, Zara and Arlo were in the Control Centre,” mused Kerr. “Shanice was in Engineering. Where were Efren, Rikki and Tariq?”

“You're not going to let this go, are you,” said Arisha.

“I'm just trying to establish the facts,” said Kerr.

“Is that why you're here?” she asked. “To investigate Hugh's death and pin it on one of us?”

“No,” said Kerr. “One of my briefs is to look into his death and ascertain, if possible, the cause but it is not my aim to 'pin it', as you say, on anyone. Unless, of course, someone did cause it. It looks highly unlikely that this is the case, however.”

“Good,” said Arisha. “No one would have any reason to anyway.”

“Have you looked for a reason?” asked Kerr, finishing his bacon and eggs.

“No, of course not,” said Arisha, faintly annoyed.

“Then you can't be sure there wasn't a reason,” said Kerr. “Granted Hugh may not have been killed but it doesn't follow that no one

wished him dead.”

Arisha just stared at him in disbelief.

“Are you serious?” she demanded.

“I am always serious,” said Kerr. “However, as it would seem unlikely that Hugh was murdered then it doesn't particularly matter if someone wanted him dead. I was merely pointing out a logical error on your part. Did Hugh have a lover?”

“Excuse me?” blurted Arisha, taken aback.

“You are all young, healthy and unattached,” said Kerr, “and the Company has ensured that the sexes are equally balanced. It would not be unreasonable to presume romantic liaisons have been established.”

“What on Earth do you think goes on up here?” demanded Arisha. “Some sort of non-stop Bacchanalian orgy? You think someone got jealous of Hugh and killed him?”

“I would be greatly surprised by an orgy,” said Kerr calmly, “but people do form, shall we say, more discrete relationships. I dare say jealousies do arise from time to time. After all, this is a small highly enclosed and isolated environment but, as we have agreed, the likelihood of murder is remote. Are you saying that there are no romantic relationships on board?”

“I am not aware of any,” said Arisha stiffly. “Also, by the nature of our roles any such relationships would have to be within the team. There would be no time for the people in the different teams to get together.”

“I daresay that is true for those controlling the shuttles,” said Kerr, “but the managers and engineers can move freely.”

“Are you accusing me of having an affair with Hugh?” asked Arisha, scowling.

“Not at all,” said Kerr, “and it would not be an accusation anyway as such things are not expressly forbidden.”

“Then why are we talking about it?” asked Arisha.

“Because I am inclined to agree with you that this was suicide,” said Kerr, “and that begs the question of why. There is nothing in Hugh's periodic psychological assessments to suggest any leaning towards suicide.”

“So you're thinking he was driven to it by his lover?” asked Arisha. “Seriously?”

“Actually no,” said Kerr. “I suppose it's possible but I find it unlikely. I was actually thinking that if he did have a lover she might have an insight into his state of mind in the days leading up to his death.”

“You mean about why'd he'd kill himself?” asked Arisha. “Well, maybe but I'm pretty sure he wasn't involved with anyone.”

“Can you be certain of that?” asked Kerr.

“No,” said Arisha. “He could easily have been involved with Rikki or Shanice during their rest periods or possibly with Zara during her rest periods. I've not heard anything however, and I haven't been asked for any prophylactics.”

“Well, we'll let that lie for now,” said Kerr. “So, as his doctor, how would you account for his suicide? I'm assuming, incidentally, that he hadn't made any previous attempts that went unreported.”

“He may have tried,” said Arisha, “but if he did he didn't need any medical attention. If he had I'd have had him shipped back to Earth as soon as possible. The only things he came to me about were for a filling in one of his teeth, a minor cut on his arm when he caught it on a jagged piece of metal Shanice was repairing and some concerns he had with hair loss.”

“He was going bald?” asked Kerr. “He was only 34.”

“Premature hair loss does impact some men,” said Arisha, “and low gravity environments can exacerbate that for reasons that aren't clear yet. He asked if there were any treatments available. I suggested a scalp treatment which I had shipped up from Earth in the next supply run. I'd be surprised if the thought of going bald would have driven him to suicide though as he wasn't particularly bothered. His concern was more that the hair loss might be symptomatic of some other issue. I gave him a thorough medical check and couldn't find anything else wrong. Certainly no vitamin deficiencies or the other usual causes of hair loss.”

“I see,” said Kerr. “Did he suffer from depression?”

“We all suffer from depression up here,” said Arisha. “It's a very abnormal environment and very high-stress. The Control people have to concentrate on fast moving and constantly changing scenarios for extended periods and the engineers work with the constant pressure of a minor mistake becoming catastrophic. That's why we're selected only after rigorous psychological screening. Someone with depressive tendencies to begin with wouldn't last long up here.”

“Yes, I appreciate that,” said Kerr. “It's much the same on the deep sea rigs. So you don't think depression was the cause?”

“To be honest, I'd have to say it was the cause,” said Arisha, “but I don't know why he'd have been depressed enough to kill himself. For certain it wasn't the archetypal cry for help which it might have been if he'd just tried to asphyxiate himself. Using explosive decompression to fling himself far beyond any possible aid is a pretty definitive statement in itself.”

“Indeed,” said Kerr. “So what was he like as a person?”

“Oh, fairly self contained, self controlled,” said Arisha. “He'd have to be to be the manager of an off-Earth mining operation. Personable, good with people. Not much of a sense of humour which is understandable.” She paused for a moment. “I was going to say he was even-tempered but over the last few weeks he had become noticeably irritable. Nothing extreme. No temper tantrums or anything like that but he showed signs of impatience and, well,

irritation I'd say. Drumming his fingers and snatching at reports. Things like that."

"Interesting," said Kerr, pursing his lips. "You say over the last few weeks? Was there anything to which you could attribute the cause?"

"No," said Arisha. "It was quite gradual. In fact it wasn't until I was preparing my report on his death that I realised."

"I see," said Kerr. "You think that irritation might be related to his suicide?"

"I daresay it could have been a sign of some inner turmoil," said Arisha. "I'm not a psychiatrist but it's possible that the irritation was the outward display of some mental struggle. Being self controlled such a struggle would have had difficulty finding an outlet. And, before you ask, I have no idea what that might have been. He never discussed such things with me."

"You don't think it was anything to do with his hair loss, do you?" asked Kerr.

"Decidedly not," said Arisha. "The fact he was losing his hair didn't bother him unduly and, anyway, if it did he only had to hang on a few more months. Once back on Earth he'd have been able to get hair transplants."

"Unless he saw his hair as a fundamental part of his identity," said Kerr. "Perhaps he was afraid losing his hair meant he was losing his masculinity or something like that."

"Oh please," said Arisha, giving Kerr a look. "He wasn't the slightest bit concerned with his looks or his masculinity. You're just attempting a little pop psychology here."

"Perhaps," said Kerr. "Psychology isn't my field either." He sighed and tapped his finger a few times on the table then stopped when he found himself wondering if Arisha would see that as a sign of irritability. "Were there any other changes in him over the time you both have been here?"

“Not that I noticed,” said Arisha.

“So he was always fairly lax over discipline, dress and so forth?” asked Kerr.

“Definitely,” said Arisha. “His concern was with getting the job done, not how people dressed. Mind you, I’ve only been here six months. What he was like when he started here eighteen months ago I don’t know.”

“So he could have been quite different back then?” asked Kerr.

“That’s entirely possible,” said Arisha. “You’d have to ask Efren about that. Rikki and Shanice have only been up here six months. Zara and Tariq have also been up here that long but they wouldn’t have known him that well as they didn’t work directly with him. Why?”

“I was merely wondering if being here for the last eighteen months or so changed him in any way,” said Kerr. “Perhaps he had some latent depressive tendency that somehow wasn’t picked up in the screening that was exacerbated by life in the orbiter.”

“I suppose it’s possible,” said Arisha, wrinkling her nose, “but the screening’s pretty thorough. Talk to Efren.”

“I shall,” said Kerr. “Hmm.”

“Is that all?” asked Arisha. “I am supposed to be in the Control Centre at the moment.”

“Well, we don’t seem to be getting anywhere,” said Kerr, sitting back and frowning. “Tell me, although Hugh allowed staff to wear whatever they wanted what did he wear himself? I went through his clothes yesterday and he didn’t seem to have much beyond his uniforms and a few casual clothes.”

“No he was usually in uniform when on duty,” said Arisha, getting up. “A few times he wore his casual clothes on duty but not often.”

“Were those few times in the last few weeks?” asked Kerr, looking up

at her.

She blinked a few times while thinking.

“They might have been,” she said eventually. “We see each other when we’re off duty as well so it gets difficult to remember the context of their clothes. Ask Efren or Rikki. They’ve probably got a strong association of Hugh with the Control Centre and would more likely have noticed than me.” She leaned forward and put her hands on the table. “So you’re thinking something happened a few weeks ago which lead to Hugh becoming irritable and slacking off and ultimately killing himself?”

“I suspect I’m clutching at straws,” said Kerr. “I’ll have a look through the Management Logs to see if there’s anything there which might account for it but I’m not hopeful. Did Hugh keep a personal log?”

“I have no idea,” said Arisha, standing up straight again. “Personal logs are personal so I’d never ask.”

“I did find a note pad that the computer told me was assigned to Hugh for personal use,” said Kerr.

“Then more than likely he did,” said Arisha. “Why don’t you read it?”

“I can’t,” said Kerr. “It’s been locked with non-standard security protocols which is against regulations. Why would Hugh do that?”

“I’ve no idea,” said Arisha. “Maybe he wanted to keep his secrets secret.”

“Perhaps,” said Kerr, “and perhaps there’s a clue inside about why he killed himself.”

“Surely if he was planning on killing himself he would have wiped his personal note book beforehand,” said Arisha.

“Not necessarily,” said Kerr. “He may have left a suicide note on it.”

“Then why protect it with non-standard security?” asked Arisha.

“Exactly,” said Kerr. “Which makes me all the more anxious to read what’s inside.”

“Why not talk to Tariq or Shanice?” asked Arisha. “They’ve probably got ways of getting around security. Particularly Tariq since he’s our security officer.”

“I’d prefer at this stage they didn’t know,” said Kerr.

“Why?” asked Arisha.

“Do I need a reason?” asked Kerr.

“Yes,” said Arisha. “You strike me as a man who needs a reason for everything.”

“Mmm, perhaps,” said Kerr with a half smile.

“And you’re not going to tell me, are you,” said Arisha.

Kerr’s smile broadened.

“Suit yourself,” said Arisha. “I should get back to work.”

“I imagine if you were needed someone would have called,” said Kerr.

Arisha sighed and sat down again.

“So what else do you want to talk to me about?” she asked.

“Shoes,” said Kerr.

“You want fashion advice?” asked Arisha, surprised. “You’d be better off talking to Earth. I’m very out of touch with fashions up here.”

“No, I don’t want fashion advice,” said Kerr. “Did Hugh?”

Arisha laughed.

“I take it that’s a no, then,” said Kerr. “I rather formed that

impression going through his clothes. He was very conservative.”

“To put it mildly,” said Arisha. “Even his casual clothes looked like uniforms.”

“Quite,” said Kerr. “So why did he have a pair of green shoes which don't go with anything?”

“I didn't know he had,” said Arisha.

“So you've never seen him wearing them?” asked Kerr.

“No,” said Arisha. “He always wore black shoes or a pair of sandals.”

“I didn't find any sandals,” said Kerr.

“He was probably wearing them when he was sucked into space,” said Arisha.

“Ah, yes, that would explain it,” said Kerr. “He was off duty at the time, wasn't he.”

“Yes,” said Arisha. “It was only another hour or so before he was due back on duty.”

“So how did the others take it?” asked Kerr.

“You mean his ...?” asked Arisha.

Kerr nodded.

“They were shocked, naturally,” said Arisha. “Zara in particular took it quite hard as she was the one who located his body. It was all we talked about actually for a couple of days.”

“Only a couple of days?” asked Kerr.

“Normality reasserted itself quite quickly,” said Arisha. “After all, we're all very aware of the risks of working in space.”

"I imagine so," said Kerr. "Did anyone take it hard?"

"How do you mean?" asked Arisha, frowning.

"You said Zara was upset," said Kerr, "which is understandable, but did anyone go through a period of, say, guilt or recrimination?"

"You're back on that murder thing again?" asked Arisha.

"Actually no," said Kerr, "but when something like that happens it's only natural for people to wonder if anything they'd said or done may have contributed."

"True," said Arisha. "I did myself. If anyone else did they didn't say anything to me."

"Was Hugh well liked?" asked Kerr.

"Yes," said Arisha. "I think so. Certainly there was no antagonism or anything like that. Not excessively anyway."

"So there was antagonism?" said Kerr.

"Well inevitably there's going to be some antagonism," said Arisha. "There're only eight of us here in a fairly confined space but it was all minor. Nothing serious. No one stopped speaking to anyone else or anything like that."

"But there was antagonism," said Kerr. "Between who?"

"Between everyone," said Arisha. "But as I said it was all very minor."

Chapter Seven

Kerr stood, somewhat nervously, at the lip of the EVA Base external door. It was open and all he could see was the vast redness of Mars below him. In fact, as Efren had been delighted to inform him, from this height Mars occupied some 22 degrees of his field of vision. It was almost as though a huge reddish hole sat there beneath his feet, waiting to swallow him. Everything else was just black as the lights were on in the Base behind him although every few seconds a chain of dim ghostly containers a little above his head and some distance away swung past. Even though his EVA suit was similar to the deep diving suit he occasionally used on the rigs, this was a lot more nerve racking.

“How you doing there, Boss?” echoed tinnily in his helmet.

“All systems OK,” he said, swallowing his tension although not enough to chide Efren for not calling him Kerr. “What’s the delay?”

He was quite proud of that bit of bravado, implying as it did that he was keen to step out into the void. He wasn't but Efren didn't need to know that.

“Arisha stopped off in the Rec Room to get a cup of tea,” said Efren cheerfully. “She’ll be here in a moment or two. I’m lining up a shuttle which should be here in about five minutes.”

In fact, Arisha and Arlo had helped Kerr to put on his EVA suit and instructed him about how to get into the shuttle when it arrived. It was straight-forward and a lot easier, apparently, than getting back into a boat after a dive. After Arlo had locked his helmet in place, Arisha had tapped him on his shoulder, reminded him to not stop breathing and told him to enjoy the trip.

“Yeah,” thought Kerr. “Just relax and enjoy. What can possibly go wrong?”

“You’ll be fine,” Arlo had added. “We’ll be taking extra care of you since losing two managers out the EVA Base door won’t look good on our records!”

Arlo seemed to think that was excruciatingly funny but Kerr just found it excruciating. Arisha had given Arlo a stern look which Kerr hadn't noticed then they'd both left. Presumably Arisha had initiated decompression as not long afterwards the external door opened and nothing got sucked out.

"Can you hear me, Kerr?" asked Arisha.

"I can hear you," said Kerr, his heart rate increasing a little.

"Can you see the container chain?" she asked.

Kerr looked up and waited a couple of seconds for the containers to swing into view. At the end a shuttle was lining up to collect an empty container and Kerr could see the occasional flashes as its thrusters manoeuvred it. The chain of full containers had already been collected by a freighter and was way out of sight.

"Yes," he said. "I see the chain now."

"That's the shuttle we're taking you down on," she said. "We can only delay it a minute or two but don't worry if you stuff up entry. The next will be along in, ahh, 17 minutes."

"OK," said Kerr, praying he wouldn't stuff up. It would be bad for manager-staff relations to see him fail at what they undoubtedly considered a routine and simple task.

"Check your safety line is attached to the pod and confirm," said Arisha.

Kerr felt around his hip for the safety line and checked it was securely clipped in place. Then he followed it back to the hull of the pod. He gave it a yank and it held firm.

"Confirm safety line attached and secure," he said.

He glanced up as the container chain swung into view again and saw the shuttle had separated from the chain and had drifted closer to the orbiter.

“Pod arm extending,” said Arisha. “Three, two, one.”

Kerr felt a jerk and the arm of the pod started to move forward.

“Why doesn't the company make these damned pods big enough for someone to get inside?” he muttered.

“Please repeat,” said Arisha. “That was garbled.”

“Nothing,” said Kerr, faintly embarrassed. Despite his many deep dives over the years he'd forgotten that radios broadcast everything.

“Are you feeling OK?” asked Arisha.

“Yes,” said Kerr, reaching out to take hold of the manipulator at the end of the pod's arm.

“Good,” said Arisha. “Take hold of the pod arm and confirm.”

“I have the arm,” said Kerr.

“Passing you over to Efren for transfer,” said Arisha.

“Hey, boss,” said Efren. “Pod exit in ten seconds.”

Kerr decided to let that pass since he was entirely in Efren's hands. Reprimanding him at this moment might not be such a good idea.

“Three, two, one,” said Efren and the pod jerked forward. Kerr felt himself yanked out of the EVA Base and fought an urge to let go of the arm and grab something secure. The reddish disk of Mars swung giddily for a few moments then the pull from the pod settled everything down.

Clear of the orbiter, the pod started to rotate then, as the shuttle came into view, the pod's thrusters fired and it began to move towards the shuttle. With the light from the EVA Base gone the sky was filled with an immeasurable number of hard points of light and the bulk of the shuttle and its container became just a dark silhouette, blotting out the stars beyond. Then, without warning, the pod's lights came on and

space disappeared leaving only the shuttle, brilliantly lit.

“Umm,” thought Kerr as the shuttle rushed towards him, “slowing down might be good.”

A few moments later, the pod's forward thrusters fired; two thin jets of pale orange that reflected off the dull sand-blown side of the shuttle. Then the pod started to move slowly sideways until Kerr saw a hatch with 'Passenger And Cargo Entry' stencilled on the side. A momentary flash from the thruster on Kerr's side of the pod brought the pod to a halt, relative to the shuttle. Of course, the shuttle, the pod and Kerr were all racing along in excess of 5,000 kilometres an hour relative to some external observer but there was no reference point to make that motion apparent. To all intents and purposes they were simply motionless in space.

“I see the hatch,” said Kerr, reaching out to touch the side of the shuttle. “I am approximately one metre too far away.”

“Acknowledge,” said Efren and the arm of the pod extended exactly one metre.

“Another few centimetres,” said Kerr, reluctant to let go of the arm and drift the last little way.

Dutifully the arm extended a little further.

“That's enough,” said Kerr. He let go of the arm, reached out and flipped the cover of the external control panel up. The action pushed him away.

“What happened?” asked Efren who was watching through the pod's video-cams. Unknown to Kerr, Arisha, Arlo, Zara, Shanice and Tariq were also watching him on the primary view screen in the Control Centre. Rikki wasn't as she was engrossed in the launch of a shuttle from the launch pad on the surface. More than one of them had forgotten their own antics when first encountering weightlessness and Kerr's clumsiness was amusing to watch.

“Wasn't holding on to anything,” said Kerr bluntly. “Stupid.”

The faint static in his helmet earphones cut out and Kerr assumed Efren had cut transmission while he sniggered. A moment later the static was back.

“We’ve all done it,” said Efren. “Don’t worry about it. Use your safety line to get back to the pod.

Kerr had already done that and was pulling himself along the arm towards the hatch.

“About to open the hatch,” said Kerr, reaching out to press the Open button. “How are we doing for time?”

“Approximately one minute and fifty seconds remaining in this window,” said Efren. “No pressure.”

“Bullshit,” thought Kerr as the hatch slid open.

A light came on to reveal a space not much bigger than the coffin Kerr had been in on the freighter. Arisha had warned him that the passenger space was utilitarian but he hadn’t realised there was absolutely nothing inside except for a bar to put his feet under and two handholds. They were to stop him bouncing around during take-off and landing. There wasn’t even a view screen or any gauges to look at apart from a button to close the hatch which was inconveniently positioned beside the hatch and would therefore be difficult to reach when lying inside the hold. Forty centimetres of wiring to bring the button closer to hand was clearly too expensive for the company to justify.

“Climbing in,” said Kerr and backed away from the hatch. Holding on to the arm he lifted his legs so they were lined up with the hatch then pushed gently away with his arms. He slid gracefully into the hold then jerked to a stop and started drifting back out.

“Might help to disconnect the safety line, Boss,” said Efren, this time not even trying to hide the amusement in his voice.

“Kerr,” snapped Kerr, deciding it was time to reassert his authority.

“My bad,” said Efren. “Kerr.”

“Safety line disconnected,” said Kerr as he unclipped the safety line. He pushed again and slid into the hold with only a couple of minor bumps.

“Switching to shuttle communications in three, two, one,” said Efren. “Can you hear me, Kerr?”

“Loud and clear,” said Kerr. “Just let me close the hatch.”

He fumbled around above his head until he found the button. He felt the hatch sliding across the glove of his EVA suit.

“Hatch closed,” he said. “Confirm.”

“Confirm hatch closed,” said Efren. “Pod returning to orbiter.”

Nothing much happened for a while so Kerr lay there listening to his breathing.

“OK, shuttle now departing,” said Efren.

A moment later Kerr felt a jerk which suggested the shuttle was now moving.

“There’s a minor storm brewing,” said Efren a couple of minutes later. “Centred about eleven hundred kilometres north west of the mine. I’m going to take your final descent around it to minimise turbulence. Arrival time will be approximately two hours thirty eight minutes.”

“Acknowledged,” said Kerr. “Umm, someone might have warned me there was nothing to do in here.”

“That’s my fault,” said Arisha after a few seconds during which she and Efren had looked at each other in consternation. “Sorry about that. Umm, do you want me to pipe some music or an audio book through the comms channel?”

“No,” said Kerr. “I’ll catch up on my sleep. How do you turn off the

light in here?”

“I can turn it off from here,” said Arisha. “Do you want me to do that?”

“Yes,” said Kerr and the light blinked off, leaving him in total darkness.

“OK, this isn't so good,” thought Kerr, lifting his hand and trying to see it. Absolutely nothing was visible.

“Ahh, didn't Arlo say something about a helmet light?” he thought. “Where is it?”

He felt around the small control panel on the sleeve of his left arm. There were several switches and he couldn't remember which did what.

“Question,” he said. “Which switch on my arm panel turns on my helmet lights?”

“Umm, the bottom right,” said Arisha. “At least I think so. Just a minute.”

Kerr could hear the muttering of several voices but nothing was distinct.

“Yes, bottom right,” said Arisha. “Sorry about that. We're so used to the suits we don't think about what we're doing any more.”

“I understand,” said Kerr and flicked the switch. His helmet lights came on. Able to see again he inspected the panel on his arm and dimmed the light so it was comfortably low, making the darkness less oppressive. “Wake me when I'm due to land.”

“Will do,” said Efren. “Sleep well.” He flicked off the two-way comms channel. “Must have nerves of steel,” he remarked to Arisha.

She leaned over the view screen beside her seat and glanced at Kerr's biometric readings.

“No,” she said. “His heart rate’s up to 95, his blood pressure is elevated at 120 over 90 and he’s sweating a little. His breathing’s a bit rapid as well and his alpha brain waves are way too high for sleep. He’s as human as the rest of us.”

* * *

Stultified by boredom and unable to scratch the various little itches that appeared every now and then Kerr was greatly relieved when Rikki announced he would be landing in about three minutes. He’d suspected the landing was near as the shuttle had been buffeted a few times by turbulence and he’d started to feel some weight as he lay there but to have it confirmed was a relief. He’d dozed a little but for much of the two and a half hour trip he’d lain there with his eyes closed and mind fairly empty.

“What’s the weather like?” he asked.

“A tropical 23 degrees below zero,” said Rikki. “Atmospheric pressure around the shuttle pad is approximately 580 pascals with a wind speed of 120 kilometres per hour. Visibility is good as the fog cleared an hour ago. Cosmic radiation is high so I hope you packed your factor 500 sunscreen.”

“120k winds?” asked Kerr. “Will that affect the landing?”

“Not noticeably,” said Rikki. “The wind may be fast but it’s thin. Earth’s atmospheric pressure is around a hundred kilo-pascals so it’s more of a light breeze really.”

“That’s good to know,” said Kerr.

“You’ll be on the ground in about two minutes,” said Rikki. “Stay inside the hold. Kataline, the mine supervisor, will be there and will get you unloaded.”

“Right,” said Kerr, squashing his impatience to force open the hatch, jump out and rip off his suit. Even though he was about to land he was still a good half an hour from being able to take the suit off safely.

“Final approach now,” said Rikki. “Oops.”

“Oops? What oops?” exclaimed Kerr anxiously.

“Oh nothing,” said Rikki. “Someone just left a refuelling truck on the shuttle pad. I've requested it be moved.”

“You are joking,” said Kerr, trying to remain calm.

“Unfortunately no,” said Rikki. “Still, if we'd hit it you wouldn't have felt a thing. Hydrazine's highly explosive.” She laughed.

“I don't think that is a satisfactory response,” said Kerr. “Who is responsible for the refuelling truck?”

“Umm, Anders Johanssen,” said Rikki, trying to sound contrite. “OK, it's been moved out of range now. Preparing to land.”

Kerr felt very little beyond some slight swaying as the shuttle approached the pad, hovered then dropped down. He felt only the final thump as it touched the pad.

“Landed,” said Rikki. “Kataline should be there in a few moments.”

Kerr lay there, listening to Rikki quietly humming to herself as she monitored the progress of the other nine shuttles making their way back down to the surface. Every now and then he could hear Efren's voice but it was indistinct.

“OK, Kataline's arrived,” said Rikki. “Switching you over to the local mine comms channel in three, two, one.”

“Hello?” said a female voice. “Can you hear me Kerr? Kataline here.”

“I can hear you,” said Kerr.

“Good,” said Kataline. “I'll have you out of there in a moment.”

There was a faint hiss through the shell of his helmet then a gloved hand appeared and rested on his shoulder.

"You can get out now," said Kataline.

Kerr started to wriggle backwards but Kataline's hand stopped him.

"It's easier to roll over and crawl out," she said. "There isn't a whole lot of room here."

"Right," said Kerr and rolled over. There wasn't enough height in the hold to get on his hands and knees so he crawled on his elbows and toes. Fortunately the gravity on Mars was only a third of that of Earth which made things a lot easier. Once through the hatch he stood up and found he was on a small platform three or four metres above something that looked like a golf buggy. Someone in a suit virtually identical to his was crammed into a corner of the guard rail.

"G'day," said Kataline, extending a gloved hand. "Welcome to Hell."

"You're Australian?" he asked, touching her hand. "I thought you were English."

"I am English," she said. "You're the one who's Australian. I just said G'day to make you feel more at home."

"Ahh, thank you," said Kerr. "And Hell?"

"Look around," she said, waving a hand at the desolation surrounding the shuttle pad. "It's like a bad day at the beach with no water, sun or ice cream."

"Well, yes," said Kerr, not knowing quite what to say.

"Best get inside," said Kataline, closing the hold hatch and lowering the platform simultaneously. It stopped half a meter off the ground and she jumped off effortlessly. Kerr followed after a moment's hesitation and sat in the spare seat as Kataline took the driver's seat.

"We'll be in the Base in about twenty minutes," she said, heading for a ramp on the edge of the pad that went underground. "The shuttle pad's about twelve k away for safety reasons."

"I wanted to speak to you about that," said Kerr. "I understand landing was interrupted due to a fuel truck being left on the pad."

"Oh yeah?" said Kataline. "Doesn't sound too good. How'd you find out about it?"

"Rikki on the orbiter told me," said Kerr.

"OK," said Kataline. "She's a bit of a worrier, that one. Just a sec." She flicked a switch on her arm panel to open the mine comms channel as well. "You there Andy?"

There were a few crackles then, presumably Andy, said "Yes, I'm here."

"What's all this about a fuel truck left on the shuttle pad?" asked Kataline.

"Oh it's that fucking clip on the nozzle retaining board on truck three," said Andy irritably. "I keep telling those buggers it doesn't work properly and they keep telling me it does."

"OK, I'll have a word with them," said Kataline. "So what happened this time?"

"The fuel line came loose as the truck was driving away," said Andy. "The bloody thing ran over the nozzle and the stupid AI system got upset and had a hissy fit. I'm on my way out there now."

"OK, so it's all under control, yeah?" asked Kataline.

"More or less," said Andy. "Truck three's gonna be out until I fix it but truck two's loading up now so there shouldn't be any delays with the next shuttle."

"OK, cool," said Kataline. "Catch you later." She flicked the switch back to the local comms channel. "Did you hear all that?"

"You seem to be taking it rather lightly," said Kerr.

“It wasn't a major problem,” said Kataline. “Just a fuel line coming loose. Besides it was between the launch pad and the landing pad. Wouldn't have got in your way.”

“I see,” said Kerr frowning. “Isn't that rather besides the point? There was an equipment failure and it should have been attended to directly. Hydrazine is explosive.”

“Yeah, I know,” she said. “That's why we make the stuff three kilometres further out. Anyway, shit happens. We're always having equipment failures.”

Chapter Eight

“Why are you always having equipment failures?” asked Kerr as Kataline drove the buggy across what looked to be an endless plain of orange sand. Ahead the thin wind was whipping the fine dust up in the air and Kataline just drove straight through the dust cloud as though it wasn't there.

“Difficult to say,” said Kataline disinterestedly. “No equipment's perfect, of course, so there'll always be occasional failures which is why half the people here are engineers but it's getting worse.”

“Are you saying the equipment is getting old and worn out?” asked Kerr. “I understood this mine is only four years old.”

“Yeah, it is,” said Kataline, “and we're still some way off the projected life span of most of the gear. It's just that we're getting a lot of primarily electrical failures. Things blowing, shorting out, burning out, that sort of thing. The guys fix what they can fix and replace what they can't but the repairs often don't last as long as they should and some the new stuff goes wrong almost as soon as it's installed. It's a bugger and we can't isolate the reasons why.”

“Has this been reported to Head Office?” asked Kerr.

“Yup, several times,” said Kataline. “They have no ideas either but that's why production's dropped almost 20% in the last six months or so. They're at the point where they're just shouting at me but that isn't going to fix anything, stupid sods. I'm just waiting for the moment they threaten to fire me.”

“What will you do then?” asked Kerr.

“Quit,” said Kataline flatly. “I don't need that kind of shit. None of us do. We're working our guts out in this dump and we're getting no support. Just a bunch of tossers who've never even been down a mine let alone worked in one screaming 'fix it!' and bitching about costs and production rates. Idiots.”

“Hmm,” said Kerr. “You said production's dropped in the last six

months. What was the situation prior to that?"

"I'll show you the figures when we get to the Base," said Kataline, "but it was fairly steady. Obviously there were fluctuations due to geology but that's normal."

"So you're saying what exactly?" asked Kerr. "There's been a change in the geology and that's causing the failures?"

"I'm not saying anything," said Kataline. "Operations were going smoothly, well, smoothly enough, then the rate of failures started to increase. Why, we don't know. It's unlikely to be the geology as we've encountered no anomalies and the usual random samples are showing nothing unexpected."

"I see," said Kerr. "Or rather I don't see. You have no explanations?"

"If I had explanations we'd fix them," said Kataline irritably. "Here's an example. Eight days ago we had a logic chip in one of the primary control circuits to number five drive shaft melt. Have you any idea what it takes to melt a chip?"

"Well there could be a number of reasons," started Kerr.

"Nothing else melted," said Kataline, forestalling him. "OK the circuitry immediately around the chip melted as well but nothing else so it wasn't external heat which means it must have been internal heat but internal heat only occurs when the chip is overloaded way beyond its clock speed and it shouldn't have been overloaded. Mindy pulled the chip and checked the input relays which were well within normal operating limits so she replaced the chip with a new one. That melted within twelve seconds so she switched the drive shaft to the secondary control circuit and checked every component within the primary circuit. All were normal so she put in another new chip and fired it up on a test rig. That worked fine for an hour so she put the drive shaft back onto the primary circuit. What do you think happened?"

"The chip melted again?" asked Kerr.

"Not for seventeen hours," said Kataline. "It was working perfectly

then the chip melted again. Don't forget these chips are rated for 10,000 hours of continuous operation before failure. This time Gerhard took the entire drive shaft offline, which slowed the grinder down. Again, everything checked out as normal. No signs of any other component being affected by heat or massive levels of extraneous signals which might have caused the chip to overload. So he put in yet another chip and brought the shaft back online."

"And I imagine that one failed as well," said Kerr.

"No," said Kataline. "It's been working perfectly ever since. Like I said, no consistency. But all the time the drive shaft was out of action production was down as the grinder should be running on all five drives."

"Curious," said Kerr thoughtfully. "I suppose the failed chips could have been faulty."

"Which is why we checked the batch numbers," said Kataline. "The original chip which, incidentally, had been operating normally for a little over six thousand hours before failing, came from the same batch as the three that have replaced it. As you probably know with the way chips are manufactured if one in a batch is faulty the entire batch is faulty so how do you explain one lasting six thousand hours, one twelve seconds, one seventeen hours and one still working after a hundred and sixty or so hours? All from the same batch? "

"I don't see an obvious explanation," said Kerr, "unless there was an error in the numbering and they actually came from different batches."

"Impossible," said Kataline. "They're made in sheets of sixteen thousand at a time. All sixteen thousand are etched with the same number before being separated and that's just one example. Things like that are happening all the time. Anyway, we're here."

To Kerr's surprise a large section of the sand dune they were approaching slid to one side. Kataline drove the buggy through into a fairly large building which hadn't been readily apparent until then as it was thickly coated with the surface dust. In fact, Kerr had assumed

it was just a large dune until it became obvious Kataline wasn't going to go around it. She brought the buggy to a halt, jumped off and marched, in a manner of speaking since gravity here was only a third of that of Earth, over to a control panel. She pushed a button and the huge panel slid back, blocking the entrance behind them. A green light came on so she pushed another button and the building started to drop.

“This is a big lift,” remarked Kerr.

“The Base is twelve metres below the surface,” she said curtly, “and we need to shift big pieces of machinery. The grinder alone is eleven metres long.”

“I didn't know that,” said Kerr as the lift ground to a halt. “In fact I confess I don't actually know how the mining is carried out.”

“You can take your suit off now,” said Kataline, removing her helmet. “We're pressurised down here.”

“Ahh, good,” said Kerr, a little surprised to discover she was blonde and much the same age as he was. From her way of speaking, both over their audio discussion the previous day and on the trip from the landing site, he'd visualised her as a rather dour brunette and somewhat older. Although her expression wasn't dour she didn't look overly happy either. It took a couple of minutes to remove the suits and Kataline hung both on a rack outside the lift while Kerr had a good scratch at his various itches.

“Come into our social room and I'll give you an overview of what goes on down here,” said Kataline going into the room beside the lift. It was fitted out much like the Rec Room on the orbiter and had identical sachets of food and drink. “You want a coffee or something?”

“Yes please,” said Kerr. “Coffee.”

She gestured to one of the seats and busied herself in the kitchen area but Kerr walked back to the door and looked around. There was very little to see and what there was looked drab and uninspiring under the low level lighting. There was no one else around and the

atmosphere was depressing.

“So we're more or less in a cave?” he asked, turning back to look at Kataline. At least this room was well lit and there were some pictures of Earth landscapes on the walls; tropical forests, beaches and the like.

“Not more or less,” said Kataline, taking a mug out of the microwave and putting another in. “We are in a cave. Basically a large rectangle, sixty metres by eighteen by three high cut out of the rock. This is where we all live and work and hopefully not die.”

“That's an unusually negative perspective,” said Kerr. “Why would any of you die here?”

“Ignore me,” said Kataline, taking the other mug out of the microwave. “I'm just sour on the place. Here's your coffee.”

“Thanks,” said Kerr, taking the mug from her outstretched hand.

“I won't bother to give you the tour,” said Kataline, going over to the door to stand next to him. “It's too small. This is our recreation room. This,” and she tapped the wall to the left, “is the lift and behind it is our Equipment Store. It goes all the way to the other side as we have to store a lot of equipment. Engineering's over there and that room in front of us is the Control Centre. This is the Medical Centre,” and she jerked her thumb at the room to the right, “and my quarters are next to that. The rest of the quarters are the other side of the Control Centre. That's it. All made from Martian concrete. Bit of a shithole isn't it.”

“Is it always so dark here?” asked Kerr.

“The rooms are well lit,” said Kataline, going over to one of the chairs and sitting down. “Not much point in lighting the rest of it beyond what we need to be able to get around.”

“Well, I suppose,” said Kerr, moving over to sit opposite her. “Why is the floor vibrating?”

“That's from the mining,” said Kataline. “The face is only thirty two

hundred metres away.”

“That surprises me,” said Kerr. “Only thirty two hundred metres in four years?”

“That’s because you’re thinking in terms of conventional mines,” said Kataline. “Your background’s deep sea drilling, isn’t it?”

“Yes,” said Kerr.

“Which is similar to conventional mining,” said Kataline. “You start at a certain point and dig long tunnels, except drilling is downwards and mining is sideways. We operate differently here.”

“How so?” asked Kerr, sipping his coffee.

“Basically we dig lots of holes,” said Kataline. “We have a central core shaft with a grinder that rotates around it, rather like rolling a log. The grinder grinds up everything and feeds it to the central shaft where it’s carried up and tipped into containers. Those containers then go to a holding pen for collection by the shuttles.”

“I’m not sure I follow,” said Kerr, looking a little puzzled. “What feeds the grinder?”

“It feeds itself,” said Kataline. “Ummm ...” She looked around then jumped up and grabbed a knife from the kitchen. Returning, she sat down and picked up her coffee mug. “Right, imagine this is the core shaft, OK.” Kerr nodded. “The bottom two metres or so of the core shaft is basically a conventional drill. So, we decide where on the surface we’re going to start and we put the shaft drill on that spot and drill down two metres. Then we add the next section of the shaft which is sixteen metres long and contains an endless belt with scoops which collect the material and bring it to the surface.”

“OK,” said Kerr. “But that’s just drilling.”

“That’s right,” said Kataline. “But it’s only to get us started. Once we’ve made the hole for the core shaft we attach the grinder,” and she held up the knife. “Imagine this is a cylinder, ten and a half metres

long and covered with cutting edges, OK? A bit like a corkscrew.”

“OK,” said Kerr, watching her closely. She laid the knife on the table so one end touched the mug and the knife was at right angles to it.

“Now, this is the grinder,” she said. “It’s pushed by five drive units and rotates at the same time so as it goes around the core shaft it grinds up everything in its path. The removed material moves over to the shaft and is collected by the scoops. As the grinder does circuits of the shaft it digs lower and lower until we get to around three kilometres then we stop and pull it up and move to another location.” She demonstrated by pushing the knife around the mug.

“Three kilometres?” exclaimed Kerr. “But if the shaft is only sixteen metres metres long how do you get the material up the rest of the way?”

“We stop periodically and add an extra length to the shaft,” said Kataline. “Much like you do with your deep sea drilling.”

“I see,” said Kerr, blinking as he absorbed the scale of the operation. “So essentially you are drilling, aren’t you. Just with a very wide tip on the drill bit.”

“Well, I suppose,” said Kataline with a dismissive shrug. “Although the grinder weighs a little over 140 tonnes and it grinds, not slices.”

“Why so heavy?” asked Kerr.

“Low gravity,” said Kataline. “I should have said the grinder has a mass of 140 tonnes. On Mars it actually weighs only 54 tonnes. If we did this on Earth it wouldn’t need to be so heavy.”

“I see,” said Kerr, sitting back but still staring at the mug and knife. “But how to you separate the various rocks and ores?”

“We don’t,” said Kataline. “That’s why we do it this way. Conventional mining digs down to find a seam of whatever it is you’re mining for then follows that seam until it’s exhausted. We take everything. The regolith, rock, ores, volcanic deposits, hydrothermal deposits, the lot.

Whatever is there we grind it up to a rubble and ship it back to Earth where it's separated. The only things we extract here are precious stones which are removed from the stream going into the containers by a sensor attached to a robotic arm."

"What's regolith?" asked Kerr.

"It's the layer of loose unconsolidated rock, dust, soil and debris that covers the bedrock," said Kataline. "It's good for making building materials and that's what our various rooms are made from. Martian concrete basically."

"Hmm," said Kerr. "So why stop at three kilometres? Why not keep drilling deeper?"

"The density and pressure get too high" said Kataline. "Regardless, when we get down that far and it largely depends on the precise geology, we detach the grinder, extract the core shaft, dismantling it as we go, then hoist the grinder out with a winch."

"Interesting," said Kerr, nodding. "I like its simple efficiency."

"If only it were simple," said Kataline with a snort. "It needs constant monitoring to ensure, amongst other things, that the grinder stays level. If, for example, a section of the cutting edges breaks off then we end up with a ridge running somewhere inside the cutting circle which can cause the grinding cylinder to fracture or rupture the connection to the core shaft or just plain jam."

"Ahh, yes," said Kerr. "I can see that could cause a difficulty."

"That's an understatement," said Kataline. "We can fix a lot of things remotely but if it jams we have to send a couple of people down to unjam it which is dangerous as well as time consuming once we get past a few hundred metres. We also have to keep water circulating to prevent the grinder overheating. It doesn't move fast but a hell of a lot of energy is built up and the atmosphere isn't dense enough to dissipate it. Dust is a problem as well."

"So how fast does it move?" asked Kerr.

“The grinder removes between eight and ten centimetres on each circuit,” said Kataline, “depending on the geology and takes about two minutes per circuit.”

“That's not very fast,” conceded Kerr.

“It works out at around sixty seven metres of depth a day,” said Kataline, “and, as we're cutting a twenty two metre diameter circle, that works out at around twenty five thousand cubic metres a day in volume which is why we need so many shuttles as each cubic metre is around four tonnes. Any faster and we'd need a lot more.”

“Which would need more freighters and probably another orbiter,” said Kerr. “Likely it's not worth it unless a second mining operation was started. Do you mine continuously?”

“More or less,” said Kataline. “We stop every six hours or so to add another sixteen metres to the core shaft which takes around half an hour even though it's fully automated. We use that time to do essential maintenance to the shaft and grinder as well and every three days we swap grinders and re-cut them.”

“And the dust?” asked Kerr. “You said that was a problem?”

“Yes,” said Kataline. “A lot of dust is thrown up by the grinding itself but a hell of a lot of surface dust is blown down as well. That can jam the mechanics and has blocked the cooling water jets a couple of times as well as short circuiting the electrics and interfering with the sensors.”

“So how is that dealt with?” asked Kerr.

“Extractor fans,” said Kataline. “The collected dust is added to the containers as well.”

“And where does the water come from?” asked Kerr. “I didn't think there was water on Mars.”

“Oh, there's plenty of water,” said Kataline, “although it's in the form of ice and is mixed up with the rock. We melt it as we go. Where did

you think the water for your coffee came from?”

Chapter Nine

“I confess I hadn't given water any thought,” said Kerr. “As you know I'm new here and the learning curve is pretty steep. There's a lot to take in.”

Kataline put her mug down and gazed at Kerr.

“So why are you here?” she asked suddenly.

“I'm replacing the previous manager,” said Kerr, surprised. “You know that.”

“No, I meant why are you here,” she said, waving her hand around. “Why come down to the mine itself? Why not stay up in the orbiter and manage whatever it is you manage from up there. It's not like you have any knowledge of exoplanetary mining.”

“True,” said Kerr, “and I'm only here for the interim but I felt it important to see the actual operation for itself.”

“There's not a lot to see,” said Kataline. “Just this area which isn't a whole lot different to the orbiter except it's underground. You can't see the actual mining as it's too dangerous to go inside the bore during operation and I'm not shutting everything down just so you can tick a box to say you've inspected it. Why're you really here?”

“I'm not sure I see your drift here,” said Kerr frowning. “What are you getting at?”

“Are you here to spy on us?” demanded Kataline, leaning forward and staring intently at Kerr. “So you can say we're idle and inefficient and that's why production's down? Is that it?”

“Interesting,” said Kerr, holding her stare. “Where did that come from?”

“Being evasive, huh?” said Kataline, dropping her gaze although her intensity still showed in her taut body language.

“Not at all,” said Kerr. “It was a genuine question. Why would you think a visit from the new manager would be spying?”

“Because I’ve been getting a lot of grief from Head Office,” said Kataline, “and Hugh never bothered to come down here.”

“Why not?” asked Kerr.

“He never saw the point,” said Kataline.

“I can understand that,” said Kerr, “now that I’m down here. That said, I think you misunderstand the nature of Head Office managers. They’d never send a spy for something as trivial as efficiency. Those sorts of decisions would be based solely on the production data. The numbers would be reviewed, in fact I’m sure they’re reviewed weekly or even daily, and steps taken depending on what those numbers reveal but a spy wouldn’t tell them anything they didn’t think they already knew from the figures. And, to answer your question, no I am not a spy. I’m the replacement manager and I am here primarily to familiarise myself with the entire operation and the people.”

“Hmm,” said Kataline, sitting back in her chair.

“You probably don’t find that a satisfactory answer,” said Kerr.

“No, not really,” said Kataline. “But I imagine it’s the only answer I’m going to get.”

“Well, there is another aspect to this,” said Kerr, “and it is, I think, highly relevant to your question and that is that one of my briefs is to improve the morale of staff.”

“You think our morale needs improving?” barked Kataline, an edge to her voice.

“I think it’s essential,” said Kerr calmly. “Thinking a new manager is here to spy on you is not indicative of a happy, engaged and fulfilled supervisor and I daresay that filters downwards.”

“So you’re blaming all this on me, are you?” flared Kataline, leaning

forward again.

“Not at all,” said Kerr. “No one is blaming you or anyone else for that matter. It's apparent that the decline in production is due to equipment problems and I will ensure that Earth stops giving you grief over that. I am here to help and it's very clear to me that morale is also a significant factor. It seems that it was declining before Hugh's death and that certainly hasn't helped matters in the orbiter and very likely has had an impact down here as well even though, as you tell me, he never visited.”

“No, he didn't,” said Kataline. “Actually, we feel very isolated down here. Not even Arisha comes down when someone's sick. She just deals with medical problems remotely from the orbiter.”

“What if surgery is needed?” asked Kerr.

“She can operate from the orbiter,” said Kataline. “The Medical Room is automated.”

“I dare say that is efficient,” said Kerr, “especially in an emergency but I can see that it would feel isolating. Perhaps if I sent Arisha down here regularly to talk to you? Would that help?”

Kataline sat back again and regarded him thoughtfully.

“Yes, I think it would,” she said after a pause. “There's only the six of us here and a new face every now and then would be good, even though we know what they all look like. So long as Arisha's agreeable though.”

“Well, yes,” said Kerr. “It wouldn't help morale in either place if she was forced to come down and resented every moment. Leave it with me. I'll see what I can do.”

“OK,” said Kataline, leaning back again.

“Would it be beneficial, do you think, if occasionally individuals from the mine visited the orbiter?” asked Kerr. “A change of scenery, as it were.”

“Probably,” said Kataline. “It’s very ... monotonous down here. We don’t even get to talk to each other much.”

“What do you mean?” asked Kerr, frowning.

“Well, the two operators, Sasha and Aisley, are on duty in twelve hour shifts,” said Kataline, “which means they’re usually alone unless I’m in the Control Centre as well. The two engineers, Mindy and Gerhard, are always off fixing things and Andy, who’s our chemical engineer, spends most of his time out at the hydrazine plant. When they’re not working they’re mostly sleeping or watching movies or playing games in their quarters.”

“I see,” said Kerr, frowning. “It’s not ideal, I admit, but I also don’t see much scope for improving the social life here. It’s not as though we can organise weekly dances or outings. Unless, of course, you’d like me to try and organise something with the Chinese or South African outfits.”

Kataline snorted and almost laughed.

“No, that won’t be necessary,” she said. “We’re all fairly asocial people or we wouldn’t be here in the first place.” She hesitated then sighed. “And I daresay I am at fault here. I used to make a point of spending some time talking with everybody every day about non-work related things but I admit I’ve let that slip.”

“Perhaps it would be a good idea to start that again,” said Kerr. “For you as well as the others.”

“You’re probably right,” said Kataline. “It’s just that ... well ...”

“Just that what?” asked Kerr.

“Oh nothing,” said Kataline, waving her hand dismissively at him. “Forget it.”

Kerr just gazed at her while he sipped the last of his coffee.

“Forget what?” he asked after a couple of sips. “You don’t get on well

with the others?”

“It's not that,” she said. “We all used to get on pretty well but ...” and she petered out again.

“But ...?” asked Kerr.

“Ohh ...” said Kataline, screwing up her face, “they've become depressing. In fact we're all depressing. I'm depressing! The whole bloody place is depressing!”

“I see,” said Kerr. He leaned forward and put his mug on the table. “Let me see if I have this straight. All six of you used to get on well but now you all find each other depressing? Is that right?”

“I don't know if they find me depressing,” said Kataline, picking at her finger, “but I imagine they do. Certainly I find myself depressing.”

“And why do you think that is?” asked Kerr.

“Oh God, I don't know,” said Kataline, tossing her head a little. “Does anyone know why they're depressed?”

“Actually in my experience they usually do,” said Kerr. “Be it money worries or relationship worries or whatever.”

“Well, it's neither of those for us,” said Kataline. “We're all very well paid and none of us are in relationships. We wouldn't be here if we were.”

“True enough,” said Kerr. He hesitated for a moment. “There are other reasons though.”

“This is stupid,” exclaimed Kataline jumping up. “We're all here to do a job and it's a tough job. We all know that. No-one expects everything to be sweetness and light. Anyway, my contract expires in a few months and I'll be going back to Earth so it's a waste of time talking about it. Come on, I'll show you the Control Centre then introduce you to the others since you're here.”

“OK,” said Kerr. “One more question if I may.”

“Shoot,” said Kataline, pausing in the doorway.

“How long ago did you stop your ... chats?” asked Kerr as he stood up as well.

“Ohh, I don't know,” said Kataline. “Two or three months ago maybe. Does it matter?”

“I daresay not,” said Kerr, “but it does suggest that things haven't become irretrievable.”

“Yeah right,” said Kataline, a touch sarcastically. “You're going to turn everything around and make us all happy little bunnies then, are you?”

“I'm going to try,” said Kerr. “Or would you rather I didn't?”

Kataline stared at him for a moment then laughed.

“Oh that was sneaky,” she said, waving a finger at him. “Don't worry, I'll cooperate.”

“Good,” said Kerr, following her the few steps to the Control Centre.

It was smaller than the Control Centre in the orbiter but was crammed with screens and panels of gauges, dials and lights arranged as a semi-circular console that went from wall to wall. Opposite the console was a large view screen on the wall displaying Rikki and a section of the orbiter Control Centre. Rikki looked to be busy with her own console. In front of the mine console sat a young girl on a wheeled chair. She was probably in her mid twenties but looked younger, largely because she was wearing a pair of fluffy rabbit slippers with her official company uniform. She was dividing her attention between three screens and looking rather glum.

“This is Aisley Milne,” said Kataline, walking in to the Control Room. “Aisley, this is Magnus Kerr, the new manager.”

“Hey,” said Aisley, not looking up. “Nice to meet you.”

“Oh for crying out loud!” exclaimed Kataline, noticing Aisley's feet. “Aisley, I thought I told you to dress properly for Kerr's visit.”

“I'm in my uniform, aren't I?” said Aisley, glancing at her. “Anyway, these are comfy.” She turned back to her console and made adjustments to some displayed settings.

“I do apologise, Kerr,” said Kataline. “Umm, we're not particularly concerned with formalities here but we were warned that you liked to have everyone in uniform when on duty.”

“That's right,” said Kerr curtly. “Slackness in dress leads to slackness in performance. You can't take pride in your work if you can't take pride in your appearance.”

“Is that a fact?” said Aisley, twisting her chair round to look at him. She lifted one leg and waggled her foot. “Actually I'm rather proud of these. They're cute too.”

“Aisley!” snapped Kataline.

“Oh all right,” said Aisley huffily. “I'll go and change them. You've got the console?”

“I've got the console,” said Kataline, moving over to sit in Aisley's chair as Aisley stalked out. “Sorry about that.”

“I suggest you maintain standards after I've left,” said Kerr, pleased that Aisley had actually gone to change her footwear rather than flatly refuse. It implied discipline was still in force to some extent and hadn't completely gone by the board. “I take it you monitor the entire operation from here?”

“That's right,” said Kataline. “This section monitors the grinding process. That section the shaft and rubble conveyor and that one the container rail to the shuttle pads. The one at the end is communications and the Mine Base itself. Just a minute.”

She checked the container rail displays then flicked a switch to put audio on the main speakers.

“Shuttle 22 secured and ready for launch, Rikki,” she said. She waited a moment then frowned and twisted to look at the main view screen. Kerr turned to look as well. Rikki was engrossed in something and was twisted sideways to the screen. “Rikki, acknowledge. Can you hear me Rikki?”

Rikki didn't react.

“Oh for God's sake,” snapped Kataline. She turned back to her console and quickly typed out a message to Rikki. On screen a moment later Rikki turned to look at her console then glanced up at the cam focused on her. Kerr could see her mouth moving and a mildly puzzled look on her face but there was no sound. Clearly Rikki worked this out for herself as she turned back to her monitor and typed a short reply.

“OK, Rikki has the shuttle,” said Kataline as Aisley walked back in the Control Centre. “Aisley, you should have told me we'd lost audio to the orbiter.”

“I thought you knew,” said Aisley, sitting back down as Kataline relinquished the seat. “Mindy's onto it.”

“Where is she now?” asked Kataline.

“Wouldn't have a clue,” said Aisley, shrugging. “OK, shuttle 22's launched. Currently at 1225 metres and climbing. Container 86 lining up on shuttle 31 and shuttle 47 is midway through refuelling. Oh, Kataline, Gerhard's taken shuttle 13 offline. There's a fault with the aft starboard locking assembly. He reckons it'll take forty to forty five minutes to resolve.”

“What's the impact?” asked Kataline.

“Eleven minute delay clearing the landing pad,” said Aisley, studying her screens. “We should be able to make that up over the next two hours or so.”

“Does Gerhard need assistance?” asked Kataline. “Forty five minutes is too long.”

“I’ll ask,” said Aisley.

“Ahh, there you are,” said a Chinese girl in blue overalls appearing in the doorway. Kataline and Kerr both turned to look at her.

“Ahh, Mindy,” said Kataline, stepping towards her. “Come and meet Magnus Kerr. This is Mindy Li, engineer.”

“Delighted to meet you,” said Kerr, holding out his hand.

“Likewise,” said Mindy, touching his hand but not grasping it. She glanced at Kataline. “Did Aisley tell you about the audio?”

“Only that it's not working,” said Kataline. She glanced at Kerr. “Yesterday the video died as you know and today the audio's died. It's always something. So what's the problem, Mindy?”

“I'm not sure yet,” said Mindy. “I pulled the audio feed main circuit board and replaced it which worked for five minutes or so then that failed as well but the feeder circuits check out. I've got another circuit board and if that works I'll isolate the specific chip on the failed boards. I'll bet it's the same chip on both boards.”

“Why not isolate the failed chip before replacing the board?” asked Kerr.

“It's quicker to swap boards,” said Mindy.

“And we need audio back,” said Kataline. “It slows things down having to type everything to the orbiter.”

“Right,” said Kerr. “Don't let me interrupt you.”

Mindy nodded then went behind Aisley's console.

“Gerhard said,” said Aisley, looking up from her console at Kataline, “and I quote, 'if you think you can do it faster you can bloody do it

yourself'." She grinned. "Do you want to send a reply?"

"No," said Kataline, scowling.

"Yes," said Kerr. "Tell Gerhard that I, Kerr, want the, what was it, a locking assembly?"

"The aft starboard locking assembly," said Aisley, her grin broadening.

"Tell him I want the aft starboard locking assembly repaired in thirty minutes," said Kerr, "and the port assembly checked."

"Will do," said Aisley, turning back to her console.

"You don't approve?" asked Kerr, noticing the expression on Kataline's face.

"... in three minutes," blared Rikki. Aisley quickly leant over and turned the volume down.

"Acknowledged," said Aisley, "shuttle 33 landing in three minutes."

"So you've got the bloody thing working again then?" said Rikki. "Hello Kerr, having fun down there?"

"Yes, thank you, Rikki," said Kerr. "How are things up there?"

"Same old," said Rikki. "Oh, if you're interested, the microwave's packed up. Tariq's got it in pieces as we speak."

"I hope he's able to repair it," said Kerr. "Do we have another?"

"Yes," said Arisha, appearing on the screen beside Rikki. "Don't worry, we won't go hungry."

"Good," said Kerr. "Don't let me interrupt you."

"Aisley, put the audio back to the console," said Kataline. "We don't need it on main anymore."

“OK,” said Aisley and flicked the switch back up.

“I wanted you to hear what was going on as well,” said Kataline, glancing at Kerr.

“Which I appreciate,” said Kerr. “You were saying?”

“What about?” asked Kataline, her eyebrows furrowing.

“Speeding up the repairs to the faulty locking assembly,” said Kerr.

“Ah,” said Kataline. She shrugged. “You’re the manager. If you want to push the engineers that’s up to you.”

“It’s always good policy to set high standards,” said Kerr, “and expect them to be achieved. And when they are achieved give praise.”

“And if they’re not achieved?” asked Kataline.

“Find out why,” said Kerr. “It could be the standard isn’t achievable but if you don’t try first you’ll never know. Aisley, did Gerhard reply to my instruction?”

“No,” said Aisley.

“Hmm,” said Kerr as Mindy re-emerged from behind the console. “Let me know the exact time that that shuttle is available again.”

“Shuttle 13,” said Aisley, her glum expression back in place. “Unlucky for some, huh?”

“Yes,” said Kerr drily, “but who, exactly? That’s the question.”

Aisley looked at him thoughtfully for a few seconds then raised an eyebrow.

“OK,” she said and turned back to her console.

“Is it always this busy in here?” asked Kerr.

“Usually,” said Kataline. “The loss of audio doesn't actually make much difference as we can always send text messages but the total loss of communication would be catastrophic.”

“Yes, I can appreciate that,” said Kerr. “There are backup communication systems however?”

“Of course,” said Kataline. “We have three independent communications systems.”

“So why wasn't one of them used when the audio failed?” asked Kerr.

“The failure was in the audio pickup and replay circuits,” said Mindy who was loitering in case the audio failed quickly again. “Those connect with the comms systems but they're a single point of failure.”

“Would it not be beneficial to have redundancy there too?” asked Kerr.

“We do,” said Mindy. “Text.”

“I was thinking of a secondary audio system,” said Kerr. “Can one be established?”

“If you want,” said Mindy. “I can set it up. Just send me a work order.”

“Can I leave that with you, Kataline?” asked Kerr.

“Actually I think that would constitute a systems upgrade,” said Kataline, “which requires the manager's authorisation.”

“OK,” said Kerr. “I'll organise that directly. Are there any other ...?” He broke off as a section of one of the console screens started to flash red.

“There's a problem,” said Aisley, propelling herself rapidly over to the core shaft section of the console. She touched the red flashing light with her finger and studied the popup display. “OK, there's a drop in pressure on the number two coolant feeder pump. It's down by 7% and

falling.”

“Oh wonderful!” snarled Mindy. “That's at the bottom of the core shaft. OK, I'll be in Engineering.” She turned and marched out of the Control Centre, her back showing her irritation.

“That sounds serious,” said Kerr. “Is it?”

“We have two pumps that supply coolant to the grinder,” said Kataline, going over to stand next to Aisley so she could see the readouts directly. “A 7% drop isn't that serious but if it drops below 50% the grinder will start to overheat. Hopefully Mindy can fix it from up here.”

“And if she can't?” asked Kerr.

“Either she or Gerhard or possibly both of them will have to go down to the bottom of the bore,” said Kataline, “which means shutting down operations for a few hours. Although,” and she glanced over at the grinder section of the console, “we're currently at a depth of 2787 metres. It's probably not worth it.”

“What do you mean, 'not worth it'?” asked Kerr, frowning.

“Hmm?” asked Kataline, her attention focused on the pump data. “Oh, all I mean is since we're that deep it would make more sense to stop the cutting and bring the grinder and shaft up. We can fix the pump up here and start a fresh bore. We'll be doing that in three days anyway.”

Chapter Ten

“Yes, I can see the sense in that,” said Kerr, watching Aisley as she monitored the various screens and made adjustments every few seconds. “So when you start another bore how do you decide where to start?”

“It doesn't really matter,” said Kataline, “as we wouldn't ordinarily follow any seams. We simply remove all material. The only real restriction is keeping a minimum of sixteen metres separation between any two bores to maintain sub-surface rock integrity. A collapse in the side walls would be very disruptive. We keep an eye on the geology in case there are any anomalies such as deep lying pockets of gas or soft substrate but this area was specifically chosen for its consistency. That said, we came across a seam of palladium a year or so ago so we've been following that.”

“Palladium? What's that?” asked Kerr.

“It's a metal,” said Kataline, going over to the console to check a readout. “It's almost as conductive as copper or silver but is exceptionally resistant to corrosion, oxidation and heat which makes it a lot more valuable which is why we're following it now we've found it.”

“Interesting,” said Kerr. “How far down is the seam?”

“A little over 250 metres,” said Kataline, giving the rest of the console a quick scan before leaving Aisley to get on with her job. “What's interesting is that the seam itself is unusually coherent.”

“Explain,” said Kerr.

“Well, ordinarily metals are found as a composite within the rock,” said Kataline, “which is why the ore, the rock/metal mix, has to be separated. This seam is, from the samples we've taken at least, 98% pure palladium. I suspect that at some point in the last couple of billion years a stream of liquid composite flowed through this area and the palladium either floated to the top or sank to the bottom of the stream depending on the composition of the rest of the flow. It's

mildly interesting but doesn't really matter. What's more important is that it seems to run in a fairly straight line between Syrtis Major Planum and Isidis Planitia which tends to fit in with my hypothesis."

"I'm sorry, Syrtis what?" asked Kerr.

"Syrtis Major Planum," said Kataline. "Don't you know where we are?"

"Beyond Mars, no," said Kerr. "Where are we?"

"Computer, display map one thousand kilometre radius centred on this location," said Kataline.

A moment later a map appeared on the main view screen and Kataline walked over.

"We're here," she said, tapping the centre of the screen. "On the boundary. This darker area to the west is Syrtis Major Planum, a long dead area of volcanic activity, and the lighter area to the east is Isidis Planitia, a large low lying plain. This location was chosen so that we can exploit the volcanic deposits to the west and the magma extrusions to the east which tends to support my hypothesis about the palladium stream."

"Presumably the stream was a flow from the volcanic area when it was active," said Kerr, studying the map.

"Very possibly," said Kataline. "On the other hand Mars' crust at Isidis Planitia is very thin, a little over four kilometres thick, so it's equally possible that the stream was a leakage of the underlying magma that fed the volcanic area. It's entirely possible that in time we'll uncover other similar streams which may partially account for the creation of the volcanic area."

"Interesting," said Kerr. "So where does the palladium seam lie?"

"Roughly north east to south west," said Kataline, sliding her finger over the map. "Of course I could be quite wrong in assuming the seam runs for any great distance. It could simply be a pool of palladium that got trapped in a fold during tectonic activity and may

well be quite small. We've only cut six bores along its length but rather than cut them close to each other I've been making them a kilometre or so apart to try to ascertain the extent of the seam. When we find the limits we can then cut bores all along its length."

"Yes, I follow your logic," said Kerr. "And at its source there may well be a significant amount of palladium. Presumably you're following the seam back to the source?"

"I've no way of knowing which direction that's in," said Kataline. "It could have flowed in either direction and as it's relatively deep the cost of sampling would be prohibitive. Still, my plan, such as it is, is to follow the seam south west until it runs out then track backwards."

"Wouldn't the thickness of the seam give an indication?" asked Kerr. "Presumably it would get thinner in the direction of flow and be thicker nearer the source."

"Well, there may be other factors," said Kataline, wrinkling her nose. "What's interesting is that the seam seems to stay fairly uniformly thick. We haven't been able to do a major study since our priority is the mining but it does look as though, over the six kilometres we've been exploring, that the seam is consistently around 18 centimetres thick. Which is good news for Vanofov and his buddies."

"Explain," said Kerr, glancing at Kataline and frowning.

"Do the maths," said Kataline. "Even if that's all there is it's still around 35 cubic metres of palladium which will give Mr V a pretty nice profit and some decent dividends to his shareholder buddies and the seam could run for hundreds of kilometres in either direction. Both Syrtis Major Planum and Isidis Planitia are pretty bloody big. You have any shares in Vanofov Enterprises?"

"A few," said Kerr. "I got them when I joined. It seemed a safe investment."

"Me too," said Kataline, "so I'm hoping this is a major seam and doesn't just peter out."

“Understandable,” said Kerr. “So the next bore will continue the line another kilometre into Syrtis Major?”

“Yes,” said Kataline. “Of course we won’t know if the seam’s still there until we’re three hundred metres down. Or would you rather we bored somewhere else?”

“Is there any clear benefit to boring somewhere else?” asked Kerr.

“Not that I know of,” said Kataline.

“Then continue as planned,” said Kerr. “Do you need a formal instruction to do that?”

“I will when it happens,” said Kataline.

“Very well,” said Kerr. He nodded curtly then turned back to look at Aisley. She was talking quietly into her headset while studying the container rail screens. He waited until she stopped talking and rolled her seat back to the grinder console.

“Aisley, give me a status update on shuttle 13,” he said.

Aisley sighed and rolled her eyes then propelled herself back to the container rail screens.

“It’s back online,” she announced after a cursory glance. “OK?”

“Aisley!” barked Kerr.

“What?” she muttered impatiently as she pushed herself back to the grinder console.

“Turn to face me,” barked Kerr.

She sighed and twisted the seat round.

“When I give you a request I expect you to attend to it with enthusiasm,” said Kerr forcefully. “Do not roll your eyes at me or sigh in exasperation.”

Aisley's lips tightened and she glanced at Kataline.

"Do you understand me?" barked Kerr.

"Yeah, I get you," said Aisley, her lips twisting a little.

"Excuse me?" barked Kerr. "What did you say?"

"I said I understand," said Aisley.

Kerr glared at her, his eyes boring into hers, until she looked away.

"What did you say?" he repeated.

"I said I understand," said Aisley. "Umm, Mr Kerr."

"That's better," said Kerr. "Respect is a two way process. I trust you will remember that."

"Yes, Mr Kerr," said Aisley, not looking at him.

"Good," said Kerr. "Now, Aisley, what is the status of shuttle 13?"

"Shuttle 13 is back online, Mr Kerr," she said meekly, her face a little pink.

"Thank you, Aisley," said Kerr. "How long was it offline?"

"Umm, I need to check," she said. "Um, Mr Kerr."

"Then check," said Kerr abruptly.

She glanced at Kataline who was standing silently watching then propelled herself back to the container rail screens.

"Umm, 33 minutes," she said, looking at Kerr.

He said nothing and just gazed at her.

"Umm, Mr Kerr," she said, discomfited.

“Thank you, Aisley,” said Kerr. “There's no need to call me Mr Kerr. Kerr will be sufficient. What is the status of the faulty pump?”

“Just a moment,” said Aisley and pushed her seat hard so it fairly sped back to the grinder console. “Umm, the pressure on the number two coolant feeder pump is down by 14%.”

“Any word from Mindy?” asked Kerr.

“No, but maintenance unit 7 has been deployed, um, Kerr,” she said.

“Which presumably means Mindy believes she can remedy the problem remotely?” asked Kerr.

“Yes,” said Kataline, deciding it was time she got involved. She was the supervisor after all although Kerr had taken her by surprise. “We keep a maintenance unit part way down the bore just in case.”

“Good,” said Kerr. “Now, Kataline, I would like a meeting with all staff. When would that be possible?”

“Probably never,” said Kataline, surprised at the sudden change of topic. “Umm, the Control Centre must be staffed at all times, the engineers are all over the place and Andy's over at the hydrazine plant which is past the shuttle pads. Getting everyone together in the same place and at the same time is almost impossible.”

“I see,” said Kerr. “That is unfortunate. Ah well, I dare say the main points of my meeting with the orbiter staff will have filtered down by now.”

“We did hear one or two things,” said Kataline.

“Good,” said Kerr. “As you doubtless know I am inspecting all quarters on the orbiter daily to ensure cleanliness and tidiness. It would be impracticable for me to do the same here but in the light of our earlier discussion on faces and visitations I propose to visit the mine on a weekly basis and perform similar inspections. I trust you will spread the word?”

“You think that’s really necessary?” asked Kataline, well aware her own quarters were a mess.

“Absolutely,” said Kerr noting that Aisley was listening intently while pretending to monitor something. “Living in a pigsty is not conducive to good morale or pride in one’s work. That is a good example, or rather a bad one,” and he pointed to a pool of dried coffee near one end of the console. Clearly someone had knocked over a coffee mug at some point and the spilt coffee on the console and the floor hadn’t been cleared up.

“One of the cleaning bots failed,” said Kataline, her nostrils flaring. “Everything’s failing round here.”

“So you tell me,” said Kerr. “Have you no cleaning cloths or shall I have some sent down from the orbiter?”

“Umm, I think we have some,” said Kataline, frowning “We usually leave these things to the bots. That’s what they’re there for.”

“Indeed,” said Kerr, “but you tell me that the instances of failure are increasing. Is it your intention to allow mess to build up until the console is no longer visible?”

He glanced at Aisley who quickly looked back at the console and started talking quietly into her headset.

“No, of course not!” snapped Kataline. “That’ll get mopped up in the next cleaning cycle.”

“Unless there’s another failure,” said Kerr. “What then?”

“Oh for crying out loud!” exclaimed Kataline. “I’ll go find a cloth.”

There was a quiet snigger from somewhere over near Aisley and Kataline twisted to glare at her but she was facing the console.

“Leave it for now,” said Kerr. “There is another related matter I wish to discuss with you. I would have preferred to raise it with all the staff but that would appear to be overly difficult.”

“You want us all to get on our hands and knees and scrub the entire Mine Base?” asked Kataline. She could feel her anger rising but managed to suppress it.

“In the event of all cleaning bots failing, yes,” said Kerr evenly, “but not routinely. The matter I wish to discuss is the environment. I am inclined to agree with your earlier statement. The Mine Base is depressing. Is there any restriction on energy usage here?”

“No,” said Kataline. “We have our own nuclear reactor out by the hydrazine plant. We’ve more than enough energy.”

“Good,” said Kerr. “Then I suggest we increase the lighting levels throughout, not just inside the various rooms.”

“We tried that,” said Kataline. “It just made the outside areas more depressing. It’s all that bare rock and concrete. We are, in case you didn’t know, fifteen metres below the surface.”

“I didn’t know,” said Kerr, “but I fail to see the relevance of that. The environment is depressing and we need to take steps to remedy that which will help improve morale. Paint, perhaps, or some form of panelling or wall coverings.”

“You are joking,” exclaimed Kataline as Aisley looked over in surprise. “The company would never pay for that.”

“They will if I authorise it,” said Kerr. “My brief is wide ranging. Now, what I propose is that you get together with the staff and agree between you what you would all find most pleasing.”

“You’re serious?” asked Kataline, giving him a hard look.

“Absolutely,” said Kerr. “It’s only right that those who live here should have a say in how the place is decorated. Such things should not be imposed.”

“Well, that wasn’t what I meant,” said Kataline, “although you’re right. I meant you’re serious about brightening the place up?”

"Of course," said Kerr, looking puzzled. "Why would I joke about these things?"

"It's just that it was proposed by the last supervisor down here," said Kataline, "and the then manager dismissed the idea. I never bothered to suggest it myself as Hugh never came down here and wouldn't have seen the need."

"Then it is high time that was remedied," said Kerr.

"Umm, OK," said Kataline. "Who will do the work? It'll be a big job to paint all that rock and we can't spare the time when we're on duty. It's asking a bit much for staff to do it during their rest periods."

"Have you no paint sprayers?" asked Kerr.

"No," said Kataline. "Most of the equipment is powder bonded and with the rest any paint would wear off quickly."

"Hmm," said Kerr thoughtfully. "Aisley, where is Gerhard at this moment?"

"I'll check, Kerr," said Aisley. She shifted over to the communications console and started talking into her headset. "He's just entering the lift. He'll be here in a couple of minutes."

"Good," said Kerr. "Ask him to come and see me."

"Will do," said Aisley. "Umm, do you want me to turn up the lighting now?"

"Yes," said Kerr. "Start as we mean to continue."

Aisley nodded then spoke into her headset before bringing up the environment controls on her display. She moved a slider on the screen then looked questioningly at Kerr.

He nodded and stepped outside the Control Centre.

"A little more please," he said, poking his head back inside. Aisley

adjusted the setting a little higher.

“Excellent,” said Kerr, coming back in. “Although I see what you mean about all the rock and concrete. No matter. A few days and the place will be a delight to work in.”

“Well, OK,” said Kataline dubiously.

“Incidentally, I don't suppose anyone down here plays mahjong?” asked Kerr.

“I wouldn't have a clue,” said Kataline, mystified. “Why? Are you going to make mahjong compulsory?”

“I think Mindy does,” said Aisley. “I never have.”

“No,” said Kerr. “Compulsory game playing is soul destroying and I would never do that. It has just occurred to me, Kataline, that we were talking about occasional visits by mine staff to the orbiter as a social activity and a change of scenery. Arlo mentioned to me that there are some keen players on the orbiter but they're missing a fourth. Perhaps any mahjong players here could take part. In fact, now I think of it, it could be beneficial to arrange periodic gaming or sporting tournaments for those who enjoy such things.”

“Finding time could be an issue,” said Kataline. “It's a two and a half hour trip each way.”

“Indeed,” said Kerr, “but worth considering, eh?”

“Well, yes, I suppose,” said Kataline.

“So, you are Kerr?” said a broad shouldered young man with a blonde crew cut, marching in through the door. He had a slight but unmistakable German accent and a faintly belligerent expression. Kerr stiffened and scowled at him. Aisley turned to watch and Kataline stepped forward.

“Kerr,” she said, “this is Gerhard Engelman, engineer. Gerhard, this is Mr Kerr, the new manager.”

“Ja, I am Gerhard,” said Gerhard, looking Kerr up and down. “You want me? You think maybe thirty three minutes not good enough?”

“No,” said Kerr. “I do not think thirty three minutes is good enough. I told you to get the job done in thirty minutes. Why did you take so long?”

“You engineer?” demanded Gerhard. “You know how to fix locking assemblies on shuttles?”

“No,” said Kerr. “But I do know that your estimate of forty five minutes was unacceptably long, as is demonstrated by you completing the job in thirty three minutes. Did you also check the port assembly or did you skip that task?”

“You accusing me of cutting corners?” demanded Gerhard, squaring up to Kerr.

“No,” said Kerr. “I merely asked if you did.”

“You think you are big man, eh?” sniffed Gerhard. “You think you know better because you manager, eh?” He curled his lip derisively. “You fuck off, OK. You don’t tell me how to do my job.” He turned to stomp out of the room.

Kerr raised his eyebrows and glanced at Kataline.

“Mister Engelman!” he roared as Gerhard disappeared.

“What?” demanded Gerhard, re-appearing.

“You will not address me in that tone of voice,” said Kerr, very coldly. “And furthermore you will address me as Mr Kerr. Am I clear?”

“Pah,” spat Gerhard. “So what you going to do about it? Eh, big man?”

“I do not make idle threats,” said Kerr, forcefully. He stepped close to Gerhard and eyeballed him. “I will not tell you what I will do until you push me into doing it but I guarantee that you will not like it. I will,

however, tell you what you are going to do. First you will change your attitude. Second, you will be calm and cooperative. Third you will be polite at all times to me and to all other members of staff. I will not tolerate insubordination in any form. Do I make myself clear?"

Gerhard backed away a little.

"What?" he blurted.

"What, Mr Kerr," snapped Kerr, stepping forward again and keeping his eyes locked on Gerhard's.

They stared at each other and the tension in the room rose appreciably. Kataline glanced over at Aisley who was avidly enjoying every moment. Gerhard's right hand clenched and unclenched unconsciously but Kerr remained icily calm.

"Ja," said Gerhard after what seemed an eternity. He broke eye contact and his broad shoulders sagged a little.

"Have I made myself clear?" asked Kerr, his quiet voice seeming loud in the silence in the room.

"Ja," said Gerhard again, this time relatively quietly.

"I didn't hear that," said Kerr, his eyes still locked on Gerhard's even though Gerhard was looking at the floor.

"I said ja," said Gerhard tersely, trying to bolster his aggression.

"Mr Kerr," said Kerr, putting some anger in his voice.

There was another round of tense silence as Gerhard glanced at Kataline and Aisley then back at Kerr. He wiped his mouth with his hand.

"Ja, I understand, Mr Kerr," he said weakly.

"Good, said Kerr. "And just so we are quite clear, when I give you an instruction to do something in a certain time you will do it in that

time or have a very good reason why not. Is that clear?”

“Ja,” said Gerhard, sagging even more. “Good reason, ja.”

“Excellent,” said Kerr, stepping back. “Now we clearly understand each other I want to talk to you about redecorating.”

Chapter Eleven

Kerr woke with a start and stared into the darkness, his body taut and his hands clenched. It took him a moment to realise he was back in his quarters on the orbiter but when he did his body relaxed and his hands unclenched. He wiped a hand over his face and found his forehead was sweaty.

“Strange,” he thought, looking at his hand in the darkness. “It’s not hot in here.”

“Computer, what time is it?” he asked.

“08:54,” said the computer.

“Right,” muttered Kerr and groaned. He still felt tired even though he’d slept all night and it wasn’t worth going back to sleep as his alarm call would wake him in six minutes. With an element of determination he sat up and swung his legs over the side of the bed.

“Lights,” he said and wiped his hand over his face again. The sweat was drying although his face, or was it his hand?, still felt clammy. The room stayed in darkness.

“Oh for crying out loud!” he muttered. “Computer, lights.” The room lights immediately came on.

“OK,” he muttered and looked around. The room was much as it had been which wasn’t surprising. He sat there for a few more moments feeling a little dopey then slapped his face hard twice, once with each hand.

“That’s better,” he said, feeling the stings push back the dopiness. He stood up and stretched then bent to touch his toes a few times.

A soft melodious gong sounded and the computer announced his 9am alarm call.

“Dismiss,” he said and strode across the room to make use of the sanitation unit.

Returning, he started to pull on his trousers then paused, bent over with one leg in and one leg out.

“That was a weird dream,” he muttered as memories of it came back to him. He frowned and shook his head to dismiss it then finished getting dressed.

The Rec Room was deserted when he climbed down the ladder which was good as he liked to contemplate the day ahead in peace and not have to make idle chitchat over breakfast. He got his usual double serving of bacon and eggs and coffee and took them over to a table, picking up a screen on the way so he could scan the news from Earth while he ate.

The hatch hissed just as he put the first forkful in his mouth and he chewed with the merest touch of resentment as he watched Arisha climb down.

“Morning,” she said. “Sleep well?”

“Yes, thank you,” he said and took another mouthful.

“Good,” said Arisha, going over to get herself some tea. “Enjoy your trip?”

“It was ... interesting,” he said. “I want to have a talk with you about it later.”

“Might as well talk about it now if you like,” she said, putting water in her mug. “I’ve heard it was quite eventful.”

“Who from?” asked Kerr, frowning.

“Does it really matter?” asked Arisha. “We’re communicating with the mine constantly so do you really expect people not to gossip?”

“I daresay not,” said Kerr. “Is Gerhard always like that? I’m surprised he got through screening with that attitude.”

“Actually no,” said Arisha, taking her tea out of the microwave. She

came over and put her note book on the table before sitting down. "No, Kataline and I were talking about him a couple of weeks ago. He used to be a calm, even tempered man but over the last few months he's become increasingly withdrawn and bad tempered. She was wondering whether or not to put him up for counselling and wanted my opinion."

"I see," said Kerr. "And what did you advise?"

"I said I'd have a talk with him first," said Arisha, curling both hands around her mug.

"And?" asked Kerr, loading his fork with some bacon.

"I haven't got around to it yet," said Arisha. "It was the day before Hugh died and things got a little chaotic after that. He's on my list although I think I'll hold off for a while now and see what effect your, ah, meeting with him had. You never know, that might be all that was needed to realign him."

"Perhaps," said Kerr and chewed thoughtfully. "Yes, I agree. In my experience a timely sharp reprimand can be more beneficial than extended counselling."

"Oh, before I forget," said Arisha. "Zara's lining up today's freighter arrival and the new uniforms are on board. Four sets for each of us. Do you want them distributed when she's collected them or put into stores for collection or what?"

"Distribute them," said Kerr, "and have everyone's old uniforms destroyed."

"We don't destroy anything up here," said Arisha. "We recycle but I take your point. The new uniforms will be symbolic of the ending of the old regime and the beginning of a new one."

"I'm not entirely sure I like your use of the word 'regime'," said Kerr, "as it has overtones but yes, something along those lines. Out with the old and in with the new, that sort of thing. And, now I've been down to the Mine Base, I want new uniforms for everyone there as well."

“OK,” said Arisha, powering up her note book. “I’ll add that to the next delivery. Shall I tell them or do you want it to be a surprise?”

“Tell them,” said Kerr. “I particularly want the staff in the Base to know there is a new regime, as you put it, and that I am concerned for their welfare. They didn’t seem to be particularly impressed with Hugh’s hands-off approach. Or yours, for that matter.”

“Me?” exclaimed Arisha, looking up from her note book. “What have I done?”

“Perhaps I phrased that badly,” said Kerr. “Certainly I attach no blame to you.” He pushed his empty plate away and sat back. “Kataline explained to me that, as a group, they feel isolated and, I daresay, abandoned. This is, or so I understand, largely because Hugh and the previous manager whose name I don’t know, never visited the surface. Doubtless they had their reasons but I intend to go down on a weekly basis. Another factor, which is where you come in, is that all medical matters are dealt with remotely by you.”

“Well, is there any real need for me to travel in a shuttle for five hours just to dole out a few aspirin?” asked Arisha.

“Well, this is one of the points I wanted to discuss with you,” said Kerr, sipping his coffee. “On the face of it I would say no. It is inefficient and your time would ordinarily be better used for some other purpose. However, this is not an ordinary situation. I was disconcerted to discover that morale in the Mine Base is noticeably worse than it is up here. Gerhard is perhaps more extreme than the others but I think he is symptomatic of a deeper issue.”

“Yes, I heard you had a run-in with Aisley as well,” said Arisha.

“Oh really?” asked Kerr. “How did she take it?”

“Well, Rikki said she was a bit upset and hurt,” said Arisha, “but I think on the whole she understood where you were coming from. Your, uh, management style is somewhat different to Kataline’s but it seems to be having an effect.”

"Hmm," said Kerr. "Hopefully a positive one." He tapped his finger on the side of his mug a few times. "And Kataline herself? How is she taking it?"

"I think she's relieved," said Arisha. "She knows there's a problem and ordinarily she'd be right on top of it but her morale's as low as everyone else's. I rather think she knew Gerhard was becoming a problem and was having difficulty summoning the strength to deal with him."

"You mean she couldn't be bothered?" asked Kerr, frowning.

"No, I don't mean that," said Arisha sharply. "What I mean is that it can be difficult to face a confrontation when you're already depressed and psychologically not prepared for it."

"Hmm," said Kerr, pursing his lips.

"And all their equipment failures aren't helping either," she added. "Maybe the redecorating will help."

"So that's being gossiped about as well, is it?" asked Kerr, raising an eyebrow.

"Very little new happens around here," said Arisha, "so when it does gossip is rife. Kataline's also sent me up an indent for the redecorating for you to authorise. I think you ought to know that she asked me before sending it if you were serious and if you were really going to authorise it."

"I trust you confirmed that," said Kerr.

"Yes," said Arisha. "I told her you didn't have a sense of humour and if you said you'd do it then you would. Are you going to?"

"Of course," said Kerr. The corner of his mouth twitched in a hint of a smile. "You appear to have summed me up extremely well after such a short acquaintance. I hold myself to the same standards I expect from others."

"It's a talent I have," said Arisha, scrolling through her note book. "Ahh, here it is. Four hundred litres of concrete primer, sixteen hundred litres of acrylic paint in assorted colours, she's listed them, and a fairly lengthy list of wall hangings, fabrics and pictures. Umm, I did a preliminary cost estimate and it's going to be rather expensive."

"Cost is irrelevant," said Kerr, dismissing it with a wave of his hand. "However much it is I don't expect it'll put any noticeable dent in the company's profits for the year. I confess though that I'm impressed they put the indent through so quickly. I left there barely twelve hours ago."

"They had a big meeting to discuss it as soon as you left," said Arisha with a smile. "I wouldn't be surprised if you've had a significant impact. Kataline said there was some excitement at the idea."

"I hope so," said Kerr. "Where's the requisition for me to sign?"

"Here," said Arisha, pushing the note book across.

Kerr skimmed it then signed it with his thumbprint.

"Shall I send it now or with the next routine order?" asked Arisha, taking the notebook back.

"Send it now," said Kerr, "as a special order and copy it to Kataline. That way she will know I am serious."

"OK," said Arisha and fiddled with the note book for a few moments. "There, sent."

"Excited, eh?" asked Kerr, nodding. "Good. I rather got that impression from Gerhard as well."

"Now you do surprise me," said Arisha. "I wonder if it him who suggested the wall fabrics?"

"I very much doubt it," said Kerr. "I expect that would be one of the women. No, when I raised the issue of how to do the painting without interfering with duty or rest periods he appeared to get quite engaged

with the engineering side of things and came up with several ways of adapting existing equipment. Did Kataline say anything about that?"

"Umm, she did say something about a degreasing solvent applicator," said Arisha. "I didn't really understand that part."

"That must be what he's decided on," said Kerr. "Well, I hope it works and that he can convert it back to degreasing afterwards. Good."

"Are you intending to redecorate in the orbiter as well?" asked Arisha.

"You think it would be beneficial?" asked Kerr.

"Yes," said Arisha. "Aside from the fact everything up here is drab and samey I wouldn't be surprised if some resentment builds up if the Mine Base people get benefits that we don't."

"Fair point," said Kerr. "It's important to be seen to be fair. Very well, talk with the staff and see what ideas they have. There is something though that we must bear in mind which is that redecorating is only a short term solution. It doesn't cure the underlying problems. Once the novelty wears off morale will drop back down again."

"And what are your thoughts on that?" asked Arisha.

"Well, that's what I wanted to talk to you about," said Kerr. "I will be going down to the Base on a weekly basis and I would like you to do the same."

"You think there'll be any real benefits to that?" asked Arisha, her heart sinking.

"Yes, I do," said Kerr. "Firstly it will help the mine staff to feel that they are not abandoned. Secondly, as the medic and a woman you will be able to talk to them in ways that I, as the manager, cannot. There will always be that barrier whereas you are on a more equal footing. Thirdly I think when it comes to medical matters you being in the same room puts things on a more personal level. Obviously in the event of an emergency you will need to perform surgery remotely but that's different."

“Well, perhaps,” said Arisha heavily. “Will you be expecting me to do these trips during my rest periods?”

“No,” said Kerr. “I think it more appropriate that we stagger our visits so we are not both absent from the orbiter at the same time and that we allocate an entire duty period to the visits. When you are away I will cover for you.”

“So I will lose a rest period covering you when you're away?” she asked.

“There is that downside,” said Kerr, “but I was thinking along the lines of you being on call as needed, much as you are now as the medic, rather than taking what would in effect be a triple shift.”

“I have to say I don't particularly like the sound of that,” said Arisha. “Umm, and I have to admit I'd be a bit worried about the effect this will have on morale.”

“That's the whole point,” said Kerr, leaning forward. “I expect it to improve morale.”

“Actually I was thinking about morale up here,” said Arisha, “and my morale,” she thought but didn't vocalise. “This seems to be a lot of effort for the Base staff with no benefit to the orbiter staff.”

“I was hoping to be able to implement a program whereby staff in both locations can visit and interact with each other,” said Kerr. “I was hoping that would benefit the orbiter staff as well.”

“Perhaps,” said Arisha, “but you're asking a lot for people to give up their rest periods and we can't spare them during their duty periods.”

“I appreciate the idea is not without its difficulties,” said Kerr. “Perhaps one approach might be to change the duty schedules to perhaps ten hours on and ten hours off which would mean every five days each of us would have a surplus ten hour period during which visitations could be organised.”

Arisha grimaced.

“I don't think people will be too happy with that,” she said. “After all, once you take out eight hours of sleep that leaves only two hours in which to eat, exercise and get some mental relaxation and that's to say nothing about the impact on their circadian rhythms.”

“You don't think the prospect of ten hours away from the orbiter or the Base will aid that mental relaxation?” asked Kerr.

“Not with a five hour shuttle trip included,” said Arisha.

“Hmm,” said Kerr, scowling.

“And don't forget,” added Arisha, “the novelty will wear off quickly, just like with the decorating. After that it will be simply another duty and an onerous one at that.”

“Perhaps you're right,” said Kerr. He started tapping his finger on the side of his mug again.

“Which applies to me visiting on a weekly basis as well,” added Arisha, sensing she'd won the debate. “After a few visits the novelty would have worn off. Of course, I'm more than happy to go down, for social visits as well as medical ones, but on an occasional basis. I suspect that way my visits would have more impact.”

“Perhaps I didn't think this through deeply enough,” said Kerr, surprising Arisha as she'd rather formed the impression that Kerr wasn't particularly flexible once he'd made a decision. “Morale is a very difficult area to deal with and what may seem a good idea initially can easily backfire. I remember one company I worked for before joining Vanofov insisting everyone took part in monthly team building and motivational programs which, I must admit, I found to be so demotivating I resigned after three such events.”

“And we don't want that happening up here,” said Arisha quickly.

“Indeed,” said Kerr. “Well, I'm open to suggestions if you have any.”

“Actually, I think you've already demonstrated a very good morale booster,” said Arisha.

“You mean the decorating?” asked Kerr, puzzled. “I thought we’d agreed that was purely short term.”

“No,” said Arisha. “I mean listening and taking action rather than simply forcing through something regardless.”

“I like to think I always listen,” said Kerr, looking at her quizzically. “And if what I’m hearing has merits then action is desirable.”

“Exactly,” said Arisha. “You listened to me about the idea of visits and I appreciate that you’ve taken what I said on board.”

“Well, I’m not wholly convinced it was a bad idea,” said Kerr, “but I won’t force anyone into doing them, other than myself, of course. I’ll talk to people and see what can be arranged in individual cases. Am I to take it that you are not willing to visit the mine periodically?”

“Of course I am,” said Arisha, berating herself for not stopping while she was ahead. “Although perhaps once every two or three months might be better. That way my visits would be more of an event.”

“A valid perspective,” said Kerr, nodding. “Let’s go with that for now, then.”

“OK,” said Arisha, inwardly sighing in relief.

“Would you like some more tea?” asked Kerr, getting up to get himself another coffee.

“Are we finished here?” she asked.

Kerr looked at her for a few moments then sat down again. He looked faintly embarrassed.

“I had a dream last night,” he said after clearing his throat. “In fact I was thinking about it when you came in the Rec Room.”

“A nightmare?” asked Arisha.

“No,” said Kerr. He sucked his teeth for a few moments. “No, it

doesn't matter. Forget I mentioned it.” He got up to get the coffee again.

“Well, I will if you want me to,” said Arisha, “but clearly it bothered you otherwise you wouldn't have mentioned it.”

“It didn't 'bother me' as such,” said Kerr, a touch aggressively. “It's just that it was unusual. I was just wondering if you, in your medical capacity, had ever come across anything like that before but it's trivial. Just a dream. Forget it.”

“I think I'll have a Lapsang Souchong,” said Arisha. “I'm getting tired of Assam.”

“Is that tea as well?” asked Kerr.

“Yes,” said Arisha, “although it's Chinese not Indian.”

“So you're a traitor to the cause, are you?” asked Kerr, going over to the kitchen area.

“That's a strange way of putting it,” said Arisha, getting up and walking over as well. “It's just a drink.”

“True,” said Kerr, finding the sachets.

“So what was unusual about your dream?” asked Arisha.

Chapter Twelve

“I suppose what was most unusual is that I remembered it,” said Kerr, rummaging through the sachets looking for some Lapsang Souchong. “I’m told that everyone dreams every time they’re asleep but I don’t usually remember them.”

“They’re at the back,” said Arisha. “No one else touches them.”

“Ahh, right,” said Kerr, shifting his search to the back of the cupboard. “Umm, ah yes, here we are.”

He pulled the sachet out and ripped the top off before tipping it into a clean mug. He added water and put the mug into the microwave then grabbed a couple of coffee sachets.

“So what was your dream about?” asked Arisha patiently. “The floor disappeared and there was a chasm underneath?”

“Why would you think that?” asked Kerr, looking curiously at her.

“It’s a fairly common dream for people going through a significant life change,” said Arisha. “Either a bottomless chasm or a raging fire.”

“Is that so?” asked Kerr. “Interesting. So you think I’m going through a significant life change?”

“I wouldn’t know,” said Arisha, “but I imagine being taken at short notice from your old life of routine on the rigs to a Martian mining operation apparently in crisis would be quite significant.”

“Not really,” said Kerr, taking Arisha’s tea out of the microwave and putting his coffee in. “There are more similarities than differences. Both involve living and working in small, isolated, enclosed communities with long hours and high stress. So you think the mine is in crisis?”

“That’s what you’ve been telling me,” said Arisha, “and isn’t that why you’ve been sent here? To sort everything out and put it right? Regardless, what I find interesting is that you wanted to talk to me

about your dream and now you're avoiding talking about it. Why's that?"

"I'm not," said Kerr, handing her the tea. "You're the one who brought up chasms and life changes."

"OK, I apologise," said Arisha. "Your dream?"

"Nothing as interesting as chasms of fire," said Kerr. "In fact it was very boring."

"And ...?" prompted Arisha after a few seconds of watching Kerr watch the microwave counting down.

"You know what a screen looks like when it's not receiving a signal?" said Kerr, as the microwave pinged. He took out his coffee and turned to face Arisha.

"Yes," said Arisha. "It's blank."

"No, I mean when it's receiving the carrier signal but there's no data within it," said Kerr.

"You mean just static?" asked Arisha. "A mass of random black and white wavy lines and dots?"

"Exactly," said Kerr. "Well, that's what I dreamed."

"That's all?" asked Arisha, puzzled. "You dreamt you were watching a screen with nothing on it?"

"Actually no," said Kerr, leaning against the counter. "There weren't any edges the way there would be with a screen. My entire field of vision was the static. Anyway, that seemed to go on for a long time although I know it probably didn't as dreams only go for a few seconds."

"And nothing else happened?" asked Arisha, her brow furrowing.

"Not for a long time," said Kerr. "Then parts of the static started to

freeze and crack up. As they cracked they started to fall away and I could see what was behind.” He paused to take a sip of coffee then stared reflectively into the mug.

“This is like getting water from a stone,” remarked Arisha. “What was behind the static?”

“Oh, sorry,” said Kerr, glancing up. “I was just remembering it. That's the thing. There was absolutely nothing behind. Just whiteness. But this is the really strange part, as the static fell away and my whole field of vision became just the white nothingness I got a very strong sense that there was something behind the white.”

“What sort of something?” asked Arisha.

“I don't know,” said Kerr. “That's when I woke up.”

“I see,” said Arisha. She pursed her lips. “And you've never had this dream before?”

“No,” said Kerr. “At least I don't think so. I don't usually remember dreams. The only reason I remember this one is because I woke up tense and sweating.”

“Which you don't normally do?” asked Arisha.

“No,” said Kerr. “Umm ...”

“Mmm?” she asked.

“I do remember, and this is a bit stupid, but I do remember having a feeling that whatever was behind the white was powerful in some way,” said Kerr, feeling embarrassed. “Like it was evil or something except I didn't get the feeling it was evil if you see what I mean.”

“Which may account for the tension and sweating,” said Arisha thoughtfully. “An implied nightmare, rather than an actual one. That is unusual. Your quarters weren't unusually warm?”

“No,” said Kerr. “The room was at the normal temperature. So, have

you come across a dream like that before?”

“No,” said Arisha. “Finding yourself naked in front of other people or being eaten by rats and things like that are quite common dreams, as is reliving a traumatic situation. That's very common among PTSD sufferers but evil behind a white screen? No, I've not come across that before.”

“Powerful,” said Kerr, “not necessarily evil. Oh well, I don't expect it means anything.”

“That's debatable,” said Arisha. “The medical profession generally assumes dreams are merely the brain processing its waste products as you sleep but there is a large body of opinion, based primarily on the work of the psychologist Freud, that dreams are symbolic.”

“Symbolic of what?” asked Kerr.

“That's where it gets difficult,” said Arisha. “Symbols are only meaningful when you know the meaning of the symbols and, to be honest, no one knows the meaning of dream symbols so the practitioners of dream interpretation are most likely just putting their own meanings to the dream rather than interpreting any actual meaning.”

“So you think my dream has a meaning?” asked Kerr.

“I suspect not,” said Arisha. “Most likely it's just your brain working through some issues you have.”

“You mean, I suppose, that the static represents my confusion when I arrived here?” asked Kerr, “and now I'm coming to terms with it it's clearing to leave a white sheet for me to leave my mark? Perhaps the sense of something powerful behind the white is indicative of the fact I don't yet know the underlying causes and I subconsciously fear they are bad?”

“I suspect that's far too literal,” said Arisha. “And anyway why would you subconsciously think the underlying causes are bad? The mere fact you are here to resolve issues means you would consciously think

the causes are bad, not unconsciously. And why would you be afraid? Low morale and technical problems are common enough and you don't strike me as someone who would be afraid of those challenges.”

“True,” said Kerr. “I’ve dealt with such issues before.”

“Perhaps the dream is more indicative of a fear of space,” said Arisha, “which represents an unknown to you as your normal known environment is to be surrounded by water, not nothingness.”

“Perhaps,” said Kerr, raising an eyebrow. “Well, thank you for your thoughts. I won’t detain you any further.”

“Oh, right,” said Arisha, a little miffed at being dismissed so abruptly. “I’ll be in the Control Centre, then.”

Kerr nodded and watched as she collected her note book then went up the ladder, leaving her tea undrunk. He disposed of her tea and put her mug in the washer before going back to where he’d been sitting. He sat down and activated the screen on the table.

“Computer,” he said, “display Management Logs commencing three months ago on this screen.

A moments later the logs appeared on the screen and he settled down to reviewing them. They were fairly banal as little happened that wasn't routine although it was a useful exercise to see what the daily routine actually consisted of. He'd been going for perhaps twenty minutes when he heard the patter of feet as someone walked over the hatch in the corridor above. He glanced up expecting someone to come in but no one did. Perhaps a minute or so later he heard the footsteps again and again glanced up. Again no one came in. The third time he heard the foot steps his curiosity got the better of him and he climbed the ladder to investigate. The corridor was deserted. He loitered a few seconds then started to go back down the ladder. The hatch hissed closed just as the footsteps started again and he quickly pressed the button to re-open it. He put his head through in time to see the pale and unmistakably female legs of a scantily clad person walking along and up the curved corridor.

“Must be Rikki,” he thought, “as Arisha’s dark and Shanice is black.”

He closed the hatch again. Part way down the ladder he started to wonder why Rikki would be walking around and around the corridor wearing minimal clothing. There was no rule as such that she was infringing but what little he’d seen of her clothing could likely be considered provocative. He hesitated for a moment, considering, then went back up again.

This time he was standing in the corridor when Rikki appeared. She was wearing what looked to be a bottle green silk camisole and shorts with nothing underneath and was looking intently at the floor in front of her feet. She walked past Kerr without even so much as a flicker of her eyes and disappeared quite quickly behind the ceiling as the corridor curved upwards.

“How odd,” thought Kerr, watching her go. He’d expected her to at least acknowledge him which was why he didn’t say anything until she was several paces past him and likely she didn’t hear him say her name. She’d been walking at a fairly normal walking speed and, as the corridor was only 75 metres long, he didn’t have long to wait until she re-appeared. This time he positioned himself in the middle of the corridor as she approached, facing her.

“What are you doing?” he asked.

She failed to react and kept walking.

“Rikki?” he said, rather loudly and stepped aside before she crashed into him. He tapped her bare shoulder and she gasped and whirled around, panic in her eyes.

“My apologies for touching you,” said Kerr, “but you seemed unaware.”

She stared at him in confusion for a moment then looked around.

“Why am I in the corridor?” she asked.

“I wanted to ask you the same question,” said Kerr.

“Oh my God!” exclaimed Rikki, realising what she was wearing. She went bright red and blurted “excuse me” before fleeing to her quarters which were only a couple of hatches away.

Kerr looked after her with a puzzled expression then shrugged his shoulders and went back into the Rec Room.

A few minutes later the hatch hissed open and Rikki peered down. She hesitated then slowly climbed down the ladder. She was wearing her uniform now.

“I, um, wanted to apologise,” she said, a touch nervously. She went over to where Kerr was sitting and stood beside the table.

“There's no need to apologise for walking the corridor,” said Kerr, gesturing for her to sit down, “although I think some explanation for your attire is called for.”

“That's what I sleep in,” she said. She hesitated then pulled back a chair and sat down. “Umm, I don't know why I was in the corridor.” She grimaced. “Ahh, what was I doing?”

“You were just walking,” said Kerr. “I heard you walk past several times so I went up to see what was happening. You walked past me the first time without noticing me and then, when you were about to do it again, I tapped you on the shoulder. I apologise for touching you and I assure you my intent was nothing more than you attract your attention.”

“I know that,” said Rikki quickly. “I didn't think you ...” She fell silent and stared at the table for a moment. “I was asleep then I felt something land on my shoulder and I woke up and found I was in the corridor and you were there. Oh God, this is so embarrassing!”

She scrunched up a little and looked to be about to cry.

“So you have no recollection of leaving your quarters?” asked Kerr, “nor of walking around the corridor several times?”

She shook her head. “No, I was asleep.” she said. “My alarm doesn't

go off for another twenty minutes or so.”

“Then I'd say you were sleep walking,” said Kerr. “Have you done that before?”

“No!” exclaimed Rikki quickly. Then she frowned. “How would I know? If you hadn't ... woken me I'd probably have walked back to bed and woken up at the usual time. Oh Jesus! What if I do this every night?”

“I'm sure someone would have noticed before now,” said Kerr.

“But would they have said anything?” asked Rikki, horrified at the thought. “Maybe the guys have been following me or something.”

“If that were the case, one or other of them would have been in the corridor as well,” said Kerr. “There was no one there except me.”

“I guess,” said Rikki, doubtfully.

“And if you'd been seen by one of the women I'm sure they would have said something,” said Kerr, trying to be reassuring. “And it's not as though you were naked.”

“Well, that's something,” said Rikki. “Umm, are you going to log this or tell Arisha or something?”

“Do you want me to?” asked Kerr.

“I'd rather you didn't,” said Rikki. “It's embarrassing.”

“Then I won't,” said Kerr, “although if it starts to be a regular occurrence then I think Arisha should know. I take it you have no history of sleep walking?”

“No,” said Rikki. “I'm pretty sure it's never happened before.”

“I see,” said Kerr.

“Well, I'd better go to the gym,” said Rikki, standing up. “Maybe I just

have some surplus energy I need to burn off. Umm, I apologise again.”

“There's no need,” said Kerr, motioning her to sit down again, which she did. “I, however, want to reiterate my apology for touching you. It was inappropriate and, on reflection, I should not have done it. I should have spoken more loudly perhaps or guided you back to your quarters.”

“Oh don't worry about it,” said Rikki, flapping her hand at Kerr. “I'm not going to cry rape or anything and I'm glad you stopped me. I could have been walking up there for hours.”

“Well, you did do several circuits,” said Kerr, “and I've no idea how long you'd been walking before I first heard you. Anyway, we'll leave that be. I've been wanting to have a talk with you about Hugh Lamont and this would seem a good opportunity.”

“Oh yes?” asked Rikki, frowning a little.

“Do you want to get some breakfast?” asked Kerr.

“Umm, if I could get some tea,” said Rikki. “I'm a bit dry.”

“By all means,” said Kerr. He watched her walk over to the kitchen and, somewhat inevitably, remembered her in her camisole and shorts. He frowned as a thought struck him.

“I'll be back in a moment,” he said, getting up.

“OK, Kerr,” said Rikki.

Kerr went to his quarters and opened the box of Hugh Lamont's belongings. At the top were the incongruous shoes. He picked them up and looked at them.

“They're the same colour,” he thought. “Interesting.” He put them back in the box then lifted them out again and put the lid back. Taking the shoes with him he returned to the Rec Room. Rikki was sitting at the table again, assiduously avoiding looking at the

Management Logs on the screen. He put the shoes on one of the spare chairs and sat down again. Rikki glanced at them but didn't pay them any attention.

"How well did you know Hugh?" he asked.

"Reasonably well, I guess," she said, "although I've only been here six months or so. Efren would know him better."

"I'm planning to talk to Efren as well," said Kerr. "I'm just trying to get a handle on his personality and perhaps why he did what he did."

"You mean kill himself?" asked Rikki.

"Yes," said Kerr. "Does that bother you?"

"How do you mean?" asked Rikki. "Of course I'm bothered that someone I know did that."

"I mean were you upset?"

"Of course I was upset," said Rikki, her eyes narrowing. "We all were."

"Of course," said Kerr. "Stupid question. But you weren't unduly upset?"

"What does that mean?" asked Rikki. "Is there a scale of upsetness and points where people should be? I was upset but not devastated. He was a nice enough guy and I'm upset he killed himself and upset I didn't notice where he was heading and try to help him."

"But that's all?" asked Kerr.

"All?" asked Rikki, frowning. "You think I should be more upset or something? What are you getting at?"

"Were you and Hugh lovers?" asked Kerr, putting his hands flat on the table.

"God no!" blurted Rikki, spilling a little of her tea. "Whatever gave

you that idea? Has someone said something?"

"Why would someone say something?" asked Kerr.

"Fuck knows," exclaimed Rikki. Then she put her hand over her mouth. "Oh, excuse my language. Sorry."

"That's OK," said Kerr. "I apologise if I shocked you."

"You surprised me more than anything," said Rikki, "and what if we were, not that we were? It's none of your business."

"I agree," said Kerr. "What people get up to in their spare time is none of my business so long as it doesn't interrupt the smooth running of the operation. It's just that I was hoping someone who was intimate with him might have some deeper insights into his state of mind."

"So you think he killed himself over a failed love affair or something?" asked Rikki.

"It's always a possibility," said Kerr. "Umm, I couldn't help noticing earlier that your ... apparel was green. A rather dark green."

"Yes," said Rikki. "I like green. Is that a problem?"

"Not as such," said Kerr as he leaned over and picked up the shoes. "It's just that Hugh Lamont had a pair of shoes in the same colour which it seems he never wore," and he dumped them on the table.

Chapter Thirteen

Rikki stared at the shoes for several seconds then shifted her stare to Kerr.

“Are you for real?” she said, frowning at him. “You seriously think we were lovers because he had some shoes the same colour as my shorts? Oh come on! You’re wearing black trousers and I’ve got a black dress. Does that mean we’re lovers too?”

“It was just a thought,” said Kerr. He frowned as well.

“They’re not even the same shade,” said Rikki. She leaned forward, picked up one of the shoes and inspected it. “Doesn’t even look like it’s been worn much if at all. In fact it looks new.”

“So you’ve not seen these shoes before?” asked Kerr.

“Nope,” she said and put the shoe back on the chair. “Now what? You think these shoes express a subconscious yearning for me and because it was unrequited he went and killed himself? I’d say that says more about you than anything else.”

“It was a long shot,” admitted Kerr, “although the fact remains that he did kill himself.”

“Well, OK,” said Rikki, “but it wasn’t anything to do with me.”

“Then we’ll drop the matter,” said Kerr. “So what was Hugh like as a person?”

“As I said,” said Rikki, “he was a nice enough guy.”

“Which isn’t particularly descriptive,” said Kerr. “Was he calm or emotional? Was he aggressive, prone to outbursts? Self-effacing or arrogant?”

Rikki blinked a few times. “No, he wasn’t aggressive,” she said. “OK he expected his instructions to be carried out but he didn’t make threats or anything.”

“So he didn't get angry?” asked Kerr.

“Sure he got angry,” said Rikki. “We all do.”

“But would you say his anger was reasonable or unreasonable?” asked Kerr. “Did he get angry over trivial things?”

“I'm not sure where you're going with this,” said Rikki, frowning. “We live in a very strange environment up here. It's unnatural and tensions build. You'll find this out for yourself if you stay here for long.”

“So you're saying he did get angry over trivial things?” asked Kerr, raising an eyebrow.

“I suppose,” said Rikki. “Although it was mostly when things went wrong. You know, equipment failures, that sort of thing. It was more irritation rather than anger, though. I don't think I ever saw him get really angry although ...”

“Although ...?” prompted Kerr.

“Well, there was one thing,” said Rikki, pursing her lips. “Efren and I had just come on duty and Hugh came in a little later. Efren made one of his stupid little wisecracks and Hugh lost his temper and threw a note book at him.”

“What did Efren say?” asked Kerr.

“I don't remember,” said Rikki. “It was just some silly little remark. He does that sort of thing all the time. You just ignore them.”

“Efren or Hugh?” asked Kerr.

“Efren,” said Rikki. “He's very good at his job but he lets off steam by making these little comments.”

“And that angered Hugh?” asked Kerr.

“Must have done,” said Rikki. “Maybe he'd had a bad night or something.”

“Why do you say that?” asked Kerr.

“Oh God, I don't know,” said Rikki with a sigh. “It was a while ago.”

“A long while ago or quite recently?” asked Kerr.

“Oh, not so long,” said Rikki, thinking. “Maybe a couple of weeks before he killed himself. I remember now. Hugh turned up in the Control Centre looking a bit haggard and Efren said something about his going to a party and not inviting us.”

“And that's when Hugh threw the note book at him?” asked Kerr.

“Umm, I think so,” said Rikki. She drummed her fingers on the table for a few moments. “No, Hugh told him to shut up and mind his own business and Efren went 'woo-ooo' or something like that. That's when Hugh threw the note book.”

“So Efren was being insubordinate?” asked Kerr, clasping his hands in front of him on the table with the tips of his thumbs raised and touching.

“Oh it was nothing like that,” said Rikki quickly. “It was just, you know, banter. It's not like Efren was refusing to do something. Anyway, I think Hugh had just had a bad night. We all do from time to time.”

“Bad in what way?” asked Kerr.

“How would I know?” asked Rikki, looking challengingly at him. “I wasn't sleeping with him.”

“I didn't mean to imply you were,” said Kerr, waggling his thumbs. “I was asking about the nature of your bad nights.”

“Oh,” said Rikki. “Well, they don't happen that often. I usually sleep pretty well.”

“So you're saying that, on occasion, you don't sleep well?” asked Kerr.

“No,” said Rikki.

“No, you're not saying that or no you don't sleep well occasionally?” asked Kerr, a little confused.

“No, sometimes I don't sleep well,” said Rikki. “It's par for the territory.”

“I see,” said Kerr thoughtfully. “Two things. When you say 'it's par for the territory', what do you mean?”

“I mean we all have the occasional bad night,” said Rikki. “At least Efren, me and Arisha do and I'm pretty sure Hugh did. I'm guessing Shanice and Tariq do as well but I don't have that much to do with them.”

“I see,” said Kerr. “And why is that?”

“They're engineers,” said Rikki. “They're usually off fixing things in places I never go.”

“I appreciate that,” said Kerr. “I meant why do you not sleep well.”

“Ohh,” said Rikki. “I don't know. Maybe it's the food or too much coffee or something.”

“I think we're talking at cross purposes,” said Kerr. “What I meant was the nature of your bad nights although I withdraw the question if it's overly personal.”

“You mean more personal than who I'm sleeping with?” asked Rikki with a snort.

“My aim with that was merely to enquire if you had a greater insight into Hugh's state of mind,” said Kerr stiffly. “I wasn't enquiring into your personal matters as such.”

“Well, OK,” said Rikki. “So you want to know about my dreams, do you?”

“No,” said Kerr, “unless, of course, you are referring to your ambitions within the company and how I may help you achieve them.”

“I thought we were talking about bad nights?” said Rikki frowning, “not career progression.”

“Is that the nature of your bad nights?” asked Kerr. “Bad dreams?”

“Yes,” said Rikki. “Sometimes they wake me up and I can't go back to sleep.”

“I see,” said Kerr. He hesitated. “Have you talked to Arisha about this?”

“Only casually,” said Rikki. “Not professionally. They're just dreams.”

“I see,” said Kerr. He unclasped his hands and scratched the side of his jaw. “And you say Efren and Arisha have dreams as well?”

“Yes,” said Rikki. “But everyone has dreams, don't they. Even you, I imagine.”

“So I'm told,” said Kerr, noncommittally. “So you think Hugh had bad dreams as well?”

“I imagine so,” said Rikki. “I don't know though. He never talked about any, at least, not with me.”

“Interesting,” said Kerr, nodding a little. “So, in the days and weeks before Hugh killed himself did you notice anything strange about his behaviour?”

“Such as?” asked Rikki, shifting in her seat.

“Oh, I don't know,” said Kerr. “Umm, any changes in behaviour, for example? Any illogical instructions perhaps that might suggest he had a lot on his mind?”

“Not really,” said Rikki, thinking about it. She sucked her lower lip for a few moments then brushed her hair back. “He did stop wearing his

uniform though.”

“Go on,” said Kerr.

“Well, when I joined, ohh six months ago, he was always in his uniform,” said Rikki. “Even when he wasn’t on duty but that changed. Towards the end he was rarely in his uniform. He was mostly in a t-shirt and slacks.”

“But not these shoes?” asked Kerr, gesturing towards the shoes on the chair.

“No, sandals,” said Rikki.

“And was that the only change you noticed?” asked Kerr. “That and the anger?”

“I only saw him angry the once,” said Rikki. “You can’t draw any conclusions from that.”

“True,” said Kerr. “Although you did say he was irritable. Was that throughout your six months or did that change?”

“No, he was never irritable to begin with,” said Rikki, thinking back. “Actually I think that only became noticeable in the last couple of months or so.”

“And can you account for that?” asked Kerr.

“Like I said,” said Rikki, “the equipment failures were increasing.”

“And those failures have been going on for quite some time,” said Kerr. “I wonder why he wasn’t bothered to begin with and only later became irritable about them? Did he discuss the failures with Kataline?”

“Endlessly,” said Rikki. “Now if you want to talk about people getting angry ...”

“You’re saying Kataline got angry?” asked Kerr.

“Yes,” said Rikki. “Sometimes she'd be shouting at him over the view screen.”

“Why?” asked Kerr.

“You'd have to ask her,” said Rikki, “although I rather think she thought Hugh was blaming her although I don't think he was.”

“Why do you think that?” asked Kerr.

“Well, he'd asked her a lot of questions,” said Rikki. “About maintenance and so on but that's his job, isn't it. I guess she took it the wrong way. After all, there have been a lot of failures, particularly in the last few months but I would imagine that's fairly normal. After all, things do wear out and Mars isn't the most hospitable of places.”

“And how did Hugh react when Kataline got angry?” asked Kerr.

“He'd just try to calm her down,” said Rikki.

“I see,” said Kerr. “And do you think Kataline's behaviour could have preyed on his mind?”

“No idea,” said Rikki. “I wouldn't have a clue what went on in his mind. He was a bit like you in that respect. Didn't give a lot away.”

“No, I dare say not.” said Kerr.

“And besides,” said Rikki, “it was his decision to open the EVA Base door. Kataline didn't make him do it. She was just standing up for herself in the face of false accusations.”

“False accusations?” exclaimed Kerr. “You're saying Hugh was making false accusations against Kataline?”

“Oh God, I said that wrong, didn't I,” said Rikki, aghast. “No, I didn't mean Hugh was making things up and accusing Kataline of anything. It's just that she's head of the mining itself and Hugh was asking questions about the equipment failures, that's all. It's just that sitting in the Control Centre and listening to what was going on it seemed to

me that Kataline thought he was making accusations when he wasn't."

"Can you give me an example?" asked Kerr.

"Oh Jesus," muttered Rikki. "Umm, umm, oh I remember Hugh suggesting one time that they shortened the maintenance cycle and Kataline threw a fit."

"In what way?" asked Kerr.

"Ohh, that they didn't have the time or staff to do significantly more maintenance," said Rikki. "She almost accused Hugh of empire building, you know, getting more staff to make his role more important, that sort of thing."

"Wouldn't more staff at the Mine Base make Kataline's role more important?" asked Kerr.

"You'd think so," said Rikki, "but maybe she'd been having some bad nights as well. And, don't forget, she's solely responsible down there whereas up here we have two managers. Well, a manager and a deputy."

"Actually she isn't solely responsible," said Kerr. "The manager, Hugh and now me, is wholly responsible. Kataline is answerable to the manager and the manager shares the base responsibilities."

"Well, I suppose," said Rikki.

"You think the team on the surface have bad dreams as well?" asked Kerr.

"Well, yes, probably," said Rikki. "I haven't talked to any of them about it but I see them a lot on the screens and some days they just look knackered. Besides, they're in much the same environment as we are, aren't they. They'd be bound to suffer the same stresses."

"That would make sense," said Kerr. "What else can you tell me about Hugh?"

“Not much,” said Rikki. “I worked with him but I didn’t know him that well.”

“How about the day he died?” said Kerr. “I understand Hugh went to the EVA Base shortly after being relieved in the Control Centre.”

“Who told you that?” asked Rikki, frowning. “No, it was towards the end of his rest period. We were due back in a couple of hours.”

“I must have misunderstood,” said Kerr. “So you’re saying he did this after he’d been asleep?”

“I wouldn’t think so,” said Rikki. “If I was planning on killing myself I doubt I’d just wake up and do it. I’d probably not sleep at all.”

“In fact he may not have slept at all for several preceding nights,” said Kerr. “Did you notice anything unusual during his last few shifts?”

“You know,” said Rikki, “we talked about this a lot in the days after. Maybe there were a lot of signs but none of us recognised them. Maybe if he’d been more uptight than usual ... but we didn’t. He seemed pretty much as normal. Maybe a bit more withdrawn but people are like that, aren’t they. No one is exactly the same day after day. Maybe I should have gone to Arisha but, come on, what was I going to say? Hugh’s a little more withdrawn than usual so he should be relieved of duty? In hindsight maybe I should have but at the time I didn’t think anything of it.”

“No one is blaming you,” said Kerr softly.

“But you’re looking for someone to blame, aren’t you,” snapped Rikki. “That’s why you’re asking all these questions.”

“Actually no,” said Kerr. “I’m merely trying to understand the circumstances and his state of mind and, from the sound of it his state of mind wasn’t as calm as might have been desirable.”

“That’s the understatement of the year,” said Rikki forcefully. “He bloody killed himself!”

“Indeed,” said Kerr, “but let me assure you that a little inter-personal friction is not sufficient cause to blame anyone for his actions.”

“Well, all right then,” said Rikki, a little mollified.

“Can I ask you one more question?” asked Kerr.

“Do I have any choice?” demanded Rikki.

“Of course you do,” said Kerr. “This isn’t a court of law where you are obliged to answer. This is just a friendly chat.”

Rikki just stared at him for a few moments then started inspecting her fingernails.

“OK,” she said after several moments. “What else do you want to know?”

“Why did you just flare up like that?” asked Kerr. “Did something happen in Hugh’s last shift or two that you might be feeling guilty about?”

“So you are looking for someone to blame!” snapped Rikki, jumping up. “I don’t have to put up with this!”

“Then I apologise and withdraw the question,” said Kerr, staying seated. “I assure you I’m not looking for someone to blame. I’m just curious about your sudden change in ... attitude. You were quite calm and now you are angry.”

Rikki marched over to the fridge and wrenched the door open and peered inside. Then she softly closed the fridge door and slowly wandered back to where Kerr was sitting. He didn’t say a word, just watched her, wondering what she was doing.

“Sorry,” she said abruptly then dropped into her chair. “I didn’t sleep well last night. I guess I’m kind of on edge.”

“I appreciate that,” said Kerr. “You were wandering the corridor.”

“Yeah,” she said and gave him a bleak smile. “That was at the end though.”

“What do you mean?” he asked.

“Well, umm, I had this dream,” she said, looking up at him then dropping her eyes again immediately.

“Would you like to tell me about it?” asked Kerr.

“Not really,” said Rikki. “It just bothered me, that’s all. Are we done here?”

“I think so,” said Kerr. “At least for now.”

“Great,” said Rikki. “I need to go to the gym before I’m back on duty.”

“Then don’t let me keep you,” said Kerr, standing up. “I understand from Arisha that the gym workout is important.”

“Yes,” said Rikki. “Got to keep the heart pumping and all that.”

“Indeed,” said Kerr. “I shall see you in the Control Room. Thank you for our chat.”

“It’s just that,” began Rikki and Kerr paused on his way to the ladder to look at her. “It’s just that I was standing in a field,” she continued. “I was maybe 9 or 10 years old.”

“Is this your dream?” asked Kerr, coming back.

“Yes,” she said, still not looking at him. “It doesn’t sound bad, standing in a field but I know I’m alone. There’s no one else there, no animals, wind or anything. It’s just completely silent. But then I got this strong feeling that there was something. A really strong sense of dread and that someone was watching me. Even the hairs on the back of my neck were standing up so I started running but the field was huge and there wasn’t anywhere to run to but I knew there was something behind me, following me, but I was too scared to look behind me then I felt this touch on my shoulder and I screamed and I

just knew I was about to die horribly then I woke up and found I was in the corridor and it was you who'd touched my shoulder. That's why I'm on edge."

"I see," said Kerr, uncertain what to do. "But it was just a dream."

"Yeah," said Rikki, giving him a sidelong look. "Just a dream. But I've had it before, you see, only I've never woken up in the corridor before."

Chapter Fourteen

Kerr was a few minutes late when he climbed down the ladder into the Control Centre. He'd felt it inappropriate to spend time in the gym while Rikki was using the facility so soon after their discussion. Instead he spent some time reviewing the management logs before visiting the gym after Rikki had finished.

“Good morning,” he said as Efren and Rikki glanced up at his arrival.

Rikki nodded and turned back to her screen, her fingers lightly resting on her spatial control. Clearly a shuttle was either arriving or departing and she was focused on that process although her expression was sad. Efren, on the other hand, was sitting back doing nothing.

“Morning,” said Efren. “Have you heard the news from Earth?”

“Not since last night,” said Kerr, sitting in his seat.

“The Eiffel Tower's collapsed,” said Efren with barely concealed relish.

“Are you serious?” said Kerr, staring at him. He was quite taken aback at this unexpected news.

“Yes,” said Efren. “It collapsed about two hours ago. Apparently it was mid afternoon in Paris and the place was packed with tourists. They're saying over two hundred people killed and perhaps as many as a thousand injured.”

“Good God,” exclaimed Kerr. “Was there an attack or something?”

“The report says it was probably corrosion around the base,” said Efren.

“Container release in fifteen seconds,” said Rikki.

Efren jerked round and stared at his screen while his hand reached for his spatial control.

“Container release in three, two, one ...” intoned Rikki, her voice doleful.

“I have it,” said Efren. “Positioning tug.”

Rikki sat back and exhaled slowly. She twisted to glance at Kerr.

“It's terrible,” she said. “All those people ...” She slowly shook her head. “La Tour Eiffel. It is a tragedy for France.”

Kerr frowned then realisation dawned.

“You're French, aren't you,” he said.

“Yes,” said Rikki. “I was born in Paris.” She shook her head again. “La Tour Eiffel is ... was ... an icon. It wasn't just a tourist attraction. It was a symbol of our national identity.” She leaned forward again to study her screen.

“You'd think they'd have maintained it better,” interjected Efren. “Container locked. Ready to take control of shuttle 7.”

“You have control in three, two, one ...” said Rikki.

“I have control,” said Efren.

“I can't explain it,” said Rikki, shaking her head. “Maybe it wasn't corrosion. Maybe it was something else.”

“So what happened?” asked Kerr.

“Apparently there was a gust of wind,” said Rikki, letting go of her spatial control as nothing needed manoeuvring in the next minute or two. “Not a particularly strong one they said but I'm guessing it was enough to shift the centre of gravity a little towards the weakened strut and the whole thing canted over. They said on the news most of those killed fell from the viewing platform although it's a fair bet that some were killed when lumps of iron and other people landed on top of them. They also said on the news that one of the main girders landed on top of a pommes frites wagon.”

“What's that?” asked Kerr, getting up and going over to stand beside her.

“Oh, um, potato chips,” said Rikki, glancing up at him. “There'd have been a long queue as well. Lots of children I expect.”

“I'm sorry,” said Kerr, putting his hand gently on Rikki's shoulder.

“Thank you,” said Rikki, touching his hand for a moment before moving it back to her spatial control.

“Would you like to go and rest for a while to process this accident?” he asked. “Arlo or Zara can take over for a few hours.”

Rikki's shoulders slumped and he quickly took his hand away.

“No,” she said after a few moments of staring sightlessly at her screen. “I'll be fine. I'm just sad for all those people and for France. It was quite magnificent even though it served no useful purpose.”

“Well, you never know,” said Efren cheerfully. “Some of the iron we're shipping back to Earth might be used to build another one.”

“Efren!” barked Kerr. “Enough. Can't you see that Rikki's upset?”

“I was only trying to cheer her up,” said Efren, his face falling at the reprimand.

“Oh and like you'd be delighted if you had a hand in re-building the Statue of Liberty if that fell down,” retorted Rikki sarcastically.

“Actually I would,” said Efren. “I've always felt that her face wasn't quite ...”

“I said enough,” barked Kerr. “This is a terrible tragedy and your remarks are not appreciated!”

“Oh,” said Efren then muttered “I was only trying to help,” under his breath.

“Cochon américain,” muttered Rikki, under her breath as well.

“Give me a status update,” said Kerr firmly.

“Um,” said Rikki, glancing over at her second screen. “I have shuttles 15, 31, 2, and 28 coming up and shuttles 39, 31 and 12 going down. Transporter 3 due for arrival in 74 minutes.”

“And I have shuttles 28, 15 and 6 coming up,” said Efren, “and 7, 41, 34 and 11 going down. Level 4 storm approaching from the west which will impact shuttle paths in four hours or so and is likely to last for five to seven days.”

“Will the impact be significant?” asked Kerr.

“No,” said Rikki. “It should miss the launch pads by approximately four hundred kilometres and we can route the shuttles around it for the duration. It’ll probably only add a couple of minutes of flying time.”

“Good,” said Kerr. “Are you sure you’re all right?”

“I’m fine,” said Rikki, not looking at him. “It was just a shock.”

“As you wish,” said Kerr. “But let me know if there is anything I can do. Your welfare is important.”

“Thank you,” said Rikki and gave him a half smile.

Kerr nodded then glanced at her primary screen. As usual it was filled with graphics and constantly changing numbers that meant very little to him as he hadn’t undergone the six weeks of training in the data that she and Efren had had nor their months of live experience. He went back to his chair and sat down.

“Computer,” he said. “Any messages for me?”

“You have a message from the Supplies Coordinator,” said the computer. “Arrival time 18 minutes ago.”

“Ahh, excellent,” said Kerr, twisting to look at the screen beside his chair. “Computer, display message on screen.”

“You obnoxious little shit!” he exclaimed a few moments later. Efren and Rikki both turned to look at him in surprise.

“I sent a message two days ago complaining about the labelling of the foodstuffs,” said Kerr, controlling his temper. “The Supplies Coordinator,” and his voice was edged with contempt, “has taken two days to inform me that, and I quote, 'after extensive consideration we regret no remedial action can be taken'. Idiot!”

“Oh,” said Efren.

“Can I make a person to person call to Earth on this thing?” asked Kerr, tapping the screen.

“You can,” said Rikki, “but signals are currently taking four minutes and seven seconds to reach Earth. That means it'll take a little over eight minutes to get a reply so it'll be an awkward conversation.”

“Oh,” said Kerr. He scowled and drummed his fingers on the arm of his chair. “What do you mean, currently? There's a bottleneck or something?”

“No,” said Efren. “It's because of the relative positions of Earth and Mars. Currently they're quite close so messages don't take long. At their maximum separation messages will take over twenty minutes.”

“I was not aware of that,” said Kerr. “Hmm. I don't like the sound of a forty minute communication round trip. When will maximum separation be?”

“Oh, not for a couple of years,” said Efren. “It's when Earth and Mars are on opposite sides of the sun. Do you want the exact date?”

“No,” said Kerr. “Computer, reply to the Supply Coordinator's message.”

“Ready,” said the computer.

“Message begins,” said Kerr. “Further to your reply to my complaint, I confess I find myself astonished that the extensive resources of the Vanofov Corporation are unable to find any remedy to the problem of food package labelling becoming detached from the packaging before transit to the Mars Mining Operation. I daresay you likely find the issue trivial but to those living and working in the aforementioned environment not knowing what is inside a food package has a significant and negative impact on morale and has consequential knock-on impacts on productivity. I venture also to remind you that the Mars Mining Operation is one of the most profitable divisions within the Vanofov Group. I am no expert in the packaging of foodstuffs but surely the simple application of some sticky tape would not be beyond your means, even if it is far beyond your imagination? I trust you will reconsider the situation and inform me soonest what measures, if sticky tape should prove too expensive, you propose. Marcus Kerr, Manager, Mars Mining Operation. Message ends. Read it back to me.”

The computer read the message back although it lacked the emphasis Kerr had placed on certain phrases.

“Good,” said Kerr. “Computer, copy the message to the Director of Vanofov Mining and the Director of Exo-Planetary Personnel. Send.”

“Message sent,” said the computer.

“These desk bound bureaucrats annoy me,” remarked Kerr casually, pleased that Rikki and Efren had heard every word. Hopefully they'd spread the message that he would go to the highest levels on their behalf, no matter how trivial the issue might seem to be, which could only be good for the morale of those in the orbiter and the mine. That it might have a negative impact on the morale of those in the Supply and Logistics Division when a couple of senior Directors got involved wasn't his problem.

* * *

Several hours later Kerr's screen flashed and the computer informed him that a visual meeting with Kataline Murchison had been requested.

“Accept,” said Kerr.

A dimly lit Kataline appeared in a window on the screen. Her blonde hair was backlit giving a halo-like effect.

“What's happened Kataline?” asked Kerr, alarmed.

“All the lights are out,” she said. “God-damned bloody electrics! We're running on stand-alone battery lights.”

Behind her Kerr could see the screens of the Control Console brightly lit in the gloom by a lamp at either end and, judging by the hairstyle, the silhouette of Aisley.

“It looks like the console is working,” he said. “How about the mine itself?”

“The mine is functioning reasonably well,” said Kataline irritably. “We've had a couple of short circuits in the conveyor belt drives in the central core but they were easily fixed. No, it's just the lights in the Base. They're all out. The whole place is in darkness which is a bugger since the coffee machine's on the same circuit for some God-forsaken reason. I can live in the dark but I can't live without my coffee.”

“Do you know the cause?” he asked.

“Well, it's not the frigging fuses,” said Kataline, her voice hard. “That was the first thing we checked. Mindy's working on it now and Gerhard's on his way back from the hydrazine plant.”

“Why was Gerhard at the hydrazine plant?” asked Kerr.

“A pump failed,” said Kataline. “We've plenty of parts but Gerhard went over to help Anders strip it so we could get it back online quickly. We've run a little low on the stuff.”

“Was this another unexplained failure?” asked Kerr.

“No, the pump was a simple mechanical breakdown,” said Kataline.

“The lights, well, I've no idea at the moment. Hopefully Mindy'll get them fixed soon.”

“I see,” said Kerr. “It might be an idea to get Mindy to put the coffee machine on a separate circuit when she's done the lights.”

“Oh, I've already made that very clear to her,” said Kataline, her voice laden with meaning.

Aisley said something but her voice was faint and muffled.

“Just a sec,” said Kataline, holding up her hand. She turned and walked over to the console. Kerr watched as they discussed something while Aisley pointed at a screen.

“OK,” said Kataline, coming back. She sounded tired. “We're getting an intermittent fault in the container rail feedback loop. Aisley thinks it's a fault on one of the container transports rather than the rail system itself. Bear with me while I divert Gerhard.”

The communication window collapsed as Kataline broke the connection. Kerr waited patiently until the computer announced an incoming meeting request.

“Accept,” said Kerr and Kataline reappeared, still dimly lit.

“Gerhard's on his way to the suspect container transport,” reported Kataline.

“Still no progress on the lighting?” asked Kerr.

“Mindy's just told me what the problem isn't,” said Kataline. “Hopefully she'll find out what it is soon. Hey, you heard about the Eiffel Tower?”

“Yes,” said Kerr. “Terrible tragedy isn't it.”

“I guess,” said Kataline, “although my first reaction was pleasure that it isn't just me that's getting all the grief. Does that make me a bad person?”

“Yes,” said Efren quietly and sniggered. Kerr waved his hand angrily to shut him up. The last thing he needed was a Kataline even more pissed off than she already was.

“Not at all,” he said. “It’s perfectly understandable. Can I ask why the hydrazine stock is low?”

“We deliberately keep it low because it’s so explosive,” said Kataline. “Andy was starting production of another batch when the pump failed. If my luck changes we’ll have just enough to manage until this batch is ready but if not it’ll mean delaying a shuttle or two.”

“I see,” said Kerr slowly as he worked out what she meant by her luck changing then realised she was referring to her bad luck not good luck. “I don’t intend to tell you how to do your job but is it worth considering increasing the stocks of hydrazine?”

“It’s worth considering everything,” said Kataline. She hesitated for two seconds. “There, I’ve considered it. Too dangerous.”

“Perhaps in a supplementary store?” asked Kerr.

“Will you authorise the expense?” asked Kataline. “Bearing in mind we’ll need to dig out a space at least three kilometres from the Base, the current store and the launch pads as well as connecting tunnels and installing transportation systems?”

“Ahh, yes indeed,” said Kerr. “I think that would be beyond the scope of my authority. I can certainly put the proposal to Head Office however.”

“Don’t bother,” said Kataline. “If you check your files you’ll see Hugh proposed it last year and it was rejected, with due consideration.” Kerr could almost see the sarcasm with which she said ‘with due consideration’.

Suddenly the communication window flared up brightly then went dark as the brightness compensator cut in and adjusted itself and Aisley cheered in the background. A moment later Kataline reappeared, looking a lot more cheerful. More to the point the

Control Centre was properly lit again and Aisley was turning off the stand-alone lamps.

"Lights are back," announced Kataline, somewhat unnecessarily. "About bloody time."

"Good," said Kerr. "Now you can have some coffee."

"Yessss," drawled Kataline, putting a surprising amount of sensuality into that simple word. "Coffee!"

"How long were the lights out?" asked Kerr.

"Umm, over an hour," said Kataline. "Right, what can I do for you?"

"You opened the connection," said Kerr.

Kataline frowned for a few moments then snapped her fingers.

"That's right," she said. "I was going to give you an update."

"About the lights?" asked Kerr, "or the pump or the container rail?"

"Oh none of those," said Kataline. "They'll be in my daily report but they weren't worth bothering you about. There's nothing you can do anyway."

"Ahh, right," said Kerr. "So what are you updating me about?"

"I'm shifting the grinder to a new bore tomorrow," said Kataline. "We'll reach three kilometres depth on the current one around mid morning."

"I see," said Kerr. "Forgive me for asking a question that's undoubtedly perfectly obvious but why do I need to be updated on this? You're in charge of the actual mining or does the orbiter have some involvement?"

"You need to approve it," said Kataline. "I told you that when you were down here."

“Indeed you did,” said Kerr, remembering. “I had forgotten. How do I give my approval?”

“Just say it,” said Kataline. “All communications are recorded.”

“Right,” said Kerr. “I approve the start of the new bore tomorrow, Kataline. Will that do?”

“I can see we're going to get on well,” said Kataline, grinning for the first time that day. “Thanks. OK, talk to you later.”

“Before you go,” said Kerr as Kataline was about to break the connection, “can I ask where the new bore will be?”

“Nine hundred and seventy metres a little north of south west of the current bore,” she said. “Do you want the grid coordinates?”

“No, I don't think so,” said Kerr. “If I ever do I'll ask. So where will it be in relation to the Mine Base?”

“Four thousand one hundred and ninety metres from the Control Centre,” said Kataline, “on a bearing of two twenty nine degrees. Give or take a metre or so.”

“And you're still following the palladium seam?” he asked.

“Yup,” said Kataline. “If it's still there. May not be. We'll find out in a few days.”

“Good,” said Kerr. “I presume mining will stop while the transfer takes place?”

“Only for a few hours,” said Kataline. “We've already positioned the second drill base so all we need to do is dismantle the core and the tower then rebuild the tower in position. Once that's up drilling can start while we bring the grinder over.”

“That sounds like a major job,” said Kerr.

“It is but it's all automated and remotely controlled,” said Kataline.

“The most difficult part is disconnecting the grinder from the core at the bottom of the current bore. That takes about half an hour and one of the engineers needs to be at the bottom in case anything gets tangled. Once the grinder's disconnected the core can be hauled up which takes about four hours as it's three kilometres long and needs to be broken into its sixteen metre segments.”

“That's a lot of segments,” said Kerr.

“One hundred and eighty eight,” said Kataline dismissively. “That's pretty straightforward as it basically means just pulling out the joining pins holding the conveyor belt and the core sections together. The coolant pipes run separately of course. Once all the central core is removed the tower can be dismantled and the grinder hauled up. It's a big job but what slows things down is inspecting the different parts for damage and wear. Even though they're hardened steel and twelve centimetres thick the joining pins bend surprisingly easily.”

“You do have spares, of course,” said Kerr.

“Yes, several hundred,” said Kataline. “And we can straighten them or repair them if any get broken. So, assuming nothing major goes wrong we'll only halt production for six, perhaps seven hours in total.” She laughed in a funny sort of way. “Assuming nothing major goes wrong.”

Chapter Fifteen

Kerr sat and watched Rikki and Efren working at their consoles for a while, thinking about the scale of the process of moving the boring operation to a new location. He was familiar with the general principles because of his work on deep sea drilling rigs but the rigs stayed in one place. Granted new drilling sites were opened every now and then but the task of hauling everything up and re-starting fresh every few weeks he could see was a major challenge. Even hauling up the grinder at 140 tonnes was a significant undertaking. Despite the low gravity, there was still 140 tonnes of inertia to be dealt with. And, impressively, the whole move was done in only a few hours.

“Incredible!” he muttered, marvelling at the level of organisation inherent in such a move and Kataline’s casual handling of it.

“What did you say?” asked Rikki, glancing over at him.

“Oh, nothing,” said Kerr, getting up and wandering over. “I was thinking about the bore move. I’m astonished at how quickly it’s done.”

“Ahh,” said Rikki. “Well, they’ve done it before. It’s not like it’s their first time. Umm, this will be my fourth.”

“My eleventh,” chimed in Efren, watching two line drawings of a shuttle, one from the front and one from the side, as it approached a flashing line drawing of the landing pad. Various boxes on the screen displayed constantly changing figures showing height, direction, relative speed to the ground, wind speed and several other useful pieces of information, including the time to destination which was a little over one minute.

“That’s a lot of deep holes,” remarked Kerr. “The mining’s been going for about four years so that’s, what, thirty or so bores? The area must look like a Swiss cheese from above.”

“I can show you if you like,” said Rikki. “Let me just get this shuttle started back down.”

Kerr watched as she manoeuvred her shuttle away from the chain of empty containers and rotated it slightly so it was lined up ready for its descent. Then she fired its thrusters for a few seconds before giving the other shuttles under her control a quick scan in case there were problems. There weren't so she turned to face the main view screen on the wall behind Kerr.

"Computer," she said, "display satellite image centred Mine Base radius five kilometres."

The screen turned to a pale orange display with a darker section on the left.

"The Mine Base is here," she said getting up and going over to tap the centre of the screen. "We can't see it, of course, because it's underground. You see these darker dots?" She pointed to a cluster of dots near the centre, each roughly four millimetres in diameter.

"Those are the bores?" asked Kerr, going over as well.

"Yes," said Rikki. "They used to cut them in an arc going north which is why there's this cluster."

"So these," said Kerr, tracing a line of widely separated dots going off to the south west, "are the newer ones?"

"That's right," said Rikki, "and the new one will be about here," and she tapped the screen near the darker section.

"And what's all this?" asked Kerr, waving his hand over the darker section.

"That's the beginning of the Syrtis Major Planum," said Rikki. "It's mainly an area of volcanic extrusion which is why it's darker."

"Interesting," said Kerr, studying the satellite image. "And what's this?"

He pointed to a barely visible line that connected the line of dots then disappeared off the other side of the image.

“That's the container rail,” said Rikki, going back to her seat to check the progress of her shuttles. “They take the output from the bore over to the launch pads.”

“Ahh, of course,” said Kerr. “Thank you. Computer, clear satellite image.”

“You're welcome,” said Rikki.

Kerr went back to his seat and sat down.

“So I presume the rail has to be extended to the new bore,” he said thoughtfully. “How do they manage that at the same time as shifting the mining over?”

“Could you take the next shuttle, Efren?” asked Rikki.

“No problem,” said Efren. “Which one's this?”

“Shuttle 22,” said Rikki.

“Just a sec,” said Efren, scanning his displays. “Ahh yes,” and he touched a line in a list. “Taking control in three, two, one ... I have shuttle 22.”

“You have shuttle 22,” confirmed Rikki and glanced at the data on her screen before turning back to Kerr. “Sorry.”

“All good,” said Kerr. “The shuttles are never ending.”

“We'll get a break tomorrow when they move,” said Rikki. “No, they started extending the rail yesterday as they have to lay the track and electrify it which takes a while to do. Once everything's shut down they'll take out the loop and lay the last section to join the new track to the old.”

“The loop?” asked Kerr.

“It's a double track,” said Rikki. “The empty containers come out on one line and go back full on the other. The loop is the curve at the

end.”

“Of course,” said Kerr.

“What’s really impressive,” said Efren, watching his screen closely as shuttle 22 lifted off and started to climb, “is that most of the time the tracks line up perfectly so the last section just slots in.”

“Most of the time?” asked Kerr.

“Yeah,” said Efren with a snort. He looked up. “On my second move someone stuffed up their figures and the gap between the two lines was almost a metre too long. Kataline went ape shit!”

“Ahh, awkward,” said Kerr. “What happened? Did they have to dismantle the rail and rebuild it?”

“No, they just cut a couple of lengths off a rail and used those to fill the gap,” said Efren, “but it took several hours as they weren’t set up for that. Kataline has had sections of rail ready for cutting ever since but so far they haven’t been needed.”

“I’m surprised she didn’t already do that,” said Kerr. “She seems an efficient lady.”

“She was new here as well,” said Efren. “We both came up on the same transporter. Maybe the previous supervisor did and didn’t warn her.”

“You’d think the engineers would have been better prepared though,” said Kerr.

“Maybe they just got complacent,” said Rikki. “After all, back then the bores were all close to each other.”

“True enough,” said Kerr, “and the important thing is that Kataline is prepared for it now. What about the dust though? Isn’t that a problem?”

“Not with the rail,” said Efren, turning back to his console. “It’s

maglev so there's no wheels or anything to clog up. The container transports just float a few centimetres above the track.”

“Which is why it takes so long to lay the new track and join them,” said Rikki. “Shanice told me they need a hundred megawatts of power running through the rails to keep the heavy containers elevated so all the section joins need to be perfectly fitted and insulated. You don't want short-circuits or dust getting in with that kind of power.”

“Indeed not,” said Kerr, looking up as the hatch opened. “Ahh, good evening.”

“Evening,” said Arisha, climbing down with Zara following behind her. “Arlo will be along in a minute, Efren. He's just changing from the gym.”

“Right,” said Efren as Zara went over to Rikki and began their handover procedures.

“Kataline informed me that the bore move will be starting mid-morning, Arisha,” said Kerr. “So that will be towards the end of your shift.”

“Ah, right,” said Arisha. “I'll check with her exactly when she anticipates that happening. Any ongoing issues that I need to be aware of?”

“No,” said Kerr, “although they had a blackout in the Mine Base not long ago.”

“A blackout?” exclaimed Arisha, frowning and tensing up. “You mean a full systems blackout?”

“No, just the lighting,” said Kerr. “No other systems were affected and they've got the lighting back online.”

“Ahh, that's good news,” said Arisha as Arlo came in through the hatch.

“At some point Kataline will let us know the cause of the blackout,”

said Kerr. "When she does could you pass that information on to me?"

"Certainly," said Arisha. "Do you want to be woken?"

"No, it's not that important," said Kerr, "but I do want to be informed."

"OK," said Arisha. "Will do. Anything else?"

"Nothing else regarding operations," said Kerr, "although I would like to have a chat with you fairly soon. Perhaps when you've finished your systems check here?"

"OK," said Arisha. "Where will you be?"

"I'm going to the gym now," said Kerr, "then I'll be going to the Rec Room for some food."

"I'll catch up with you there then," said Arisha as Arlo started the handover procedures with Efren. "So how have you been feeling these last few days? Any dizziness? Shortness of breath?"

"I did earlier," said Kerr. "I'd been talking with Rikki in the Rec Room and felt lightheaded when I went up to the corridor so I did as you instructed and lay down and tensed my thighs. That seemed to work so I spent a few minutes longer in the gym before coming to the Control Centre."

"Good," said Arisha. "I'm pleased you didn't try to tough it out. How long have you been spending in the gym?"

"I learnt the hard way not to tough things out," said Kerr. "Never a good idea when you've been diving and have the bends."

"Decompression sickness?" asked Arisha, raising her eyebrows. "Nasty. What happened?"

"I tried to tough it out," said Kerr. "It was only when the pain in my joints got unbearable that I went to the medic and he immediately put me inside a decompression chamber for forty eight hours. Stupid of

me since I'd been warned but I was young and foolish then.”

“Well, there's nothing like a painful experience for learning,” said Arisha. “How long are you working in the gym?”

“I've been doing ten minutes on the treadmill and ten minutes cycling,” said Kerr.

“Increase that to at least fifteen minutes of each,” said Arisha. “Light headedness is nowhere near as dangerous as the bends but the impact could be fatal for all of us if it happens when you're in the Control Centre and you make some bad decisions.”

“You are right, of course,” said Kerr, inclining his head. “Well, I've leave you to it. Computer, Kerr signing off.”

“Computer, Anari taking control,” said Arisha. “Kerr, I'll catch up with you in the Rec Room.”

“Thank you,” said Kerr, glancing around. Efren and Rikki were still updating their statuses to their reliefs so he nodded genially at Arisha and went to get changed before doing his exercises.

* * *

Kerr chose a cottage pie from the cupboard and added the necessary 400ml of water before putting it in the microwave. There was no one else in the Rec Room as Efren and Rikki were, most likely, still in the gym and Shanice was off doing whatever Shanice did. Although officially the two engineers in the orbiter operated on the same shifts as the others they both operated quite independently of the others and often worked together which wasn't surprising as many of their tasks required both of them at the same time.

The microwave pinged so he took his dinner out and carried it over to a table.

“Computer,” he said, sitting down. “Remind me to make a positive remark about the tidiness of the Rec Room at the next meeting.”

“That’s a good idea,” said Arisha from the hatch.

“Ahh, I didn’t hear the hatch,” said Kerr, looking up. “Yes, positive reinforcement is important for maintaining morale.”

“Indeed,” said Arisha, jumping gracefully off the ladder. Unfortunately her landing wasn’t as graceful and she stumbled and had to grab the back of a chair to steady herself. Kerr ate some of his pie and pretended he hadn’t noticed.

“So what did you want to talk to me about?” asked Arisha, pulling the chair back a little and sitting in it as though that’s what she’d intended all along.

“The lighting,” said Kerr. “The blackout at the Base made me think of it. I’m from Australia but I seem to remember hearing that in countries that are quite high in the north and south such as Britain suffer from depression in the winter months due to the short days and long nights. Do you know anything about that?”

“Yes,” said Arisha. “It’s called Seasonal Affective Disorder and, as you say, it’s caused by the shorter days. I believe people in those countries often go to work before dawn and get home from work after sunset and spend the time in between in workplaces with little natural light. I’m from Goa in India myself so we don’t have that problem. We get too much sunlight if anything.”

“Yes, it’s the same in Australia,” said Kerr. “Still, it did occur to me that we here in the orbiter and those down in the mine are permanently under artificial light. I wondered if the lack of sunlight could be a factor in the depression that seems to affect everyone here.”

“Oh, excuse me,” said Rikki as the hatch opened. “Can I come in or is this private?”

“No, no, come on in,” said Kerr, waving his fork. “This is a communal area.”

“Thanks,” said Rikki, sliding down the ladder. “I just wanted to check

the news to see if there were any updates about the Eiffel Tower.”

“Of course,” said Kerr.

“Yes, I heard about that,” said Arisha. “Terrible, wasn't it.”

“I was stunned,” said Rikki, picking up a note book. “I just couldn't believe it.”

“Couldn't believe what?” asked Shanice, coming down the ladder as well.

“The Eiffel Tower collapsing,” said Rikki, staring at the screen. “Oh, it says that the number of dead is now only a hundred and seventy four but the number of injured is estimated to be around fifteen hundred. All the hospitals in Paris have been swamped and they're having to cancel minor procedures to cope.”

“I heard it was metal fatigue,” said Shanice, making herself a cup of coffee, “which surprises me as the tower was a well designed construction.”

“There's talk on social media that it was a terrorist attack,” said Efren, coming down the ladder as well. “Some bunch of ultra left wing anarchists. Apparently France is riddled with them.”

“Which is bullshit,” said Rikki, irritably. “You Americans see left wing terrorists everywhere.”

“Didn't say I believed it though, did I,” said Efren. “Rust seems more likely to me. After all, it's been standing for hundreds of years and it rains in Paris. Are we playing, Shani?”

“Yes,” said Shanice, going over to the games cupboard.

“Would you prefer to go somewhere quieter?” asked Arisha.

“Oh no, it's fine,” said Kerr, watching Shanice and Efren setting up a chess game. “Your thoughts on the lighting?”

“Ordinarily I'd agree with you,” said Arisha, watching Rikki reading the news. She seemed to be reading avidly but wasn't getting particularly upset. “However, the orbiter and mine are both lit with FS-LEDs throughout so they wouldn't be a problem.”

“What are those?” asked Kerr, eating some more of his pie. It was beginning to get a little cold but he couldn't be bothered to re-heat it.

“Full spectrum,” said Arisha. “They are designed to mimic natural sunlight so they have a colour temperature of around 5500K and have a high colour rendering index and being LEDs they don't flicker. Ordinary lighting has a colour temperature around 3000K and fluorescent lighting even lower. Fluorescent lights flicker a lot as well which causes headaches and eyestrain after lengthy periods.”

“I didn't know that,” said Kerr.

“It's the same with the lights in the EVA suits,” said Arisha. “They're FS-LEDs too.”

“I see,” said Kerr. He thought for a moment. “What about the screens?”

“They're LEDs too,” said Arisha, “although I don't know if they're full spectrum. Shanice, do you know?”

“Know what?” asked Shanice, looking up from the chess board. It was far too early to tell yet who was winning but they both seemed fairly absorbed in the game.

“Are the screens full spectrum?” asked Arisha.

“Of course not,” said Shanice, turning back to the board. “They're screens.”

“But what about flicker?” asked Kerr.

“LEDs don't flicker,” said Shanice, pushing a pawn forward. “That's why we use them.”

“So perhaps the extensive use of the screens is a factor?” asked Kerr.

“I’d very much doubt it,” said Arisha. “They’re flooded with natural light from the overhead lighting.”

“I see,” said Kerr. He finished his pie then licked his fork clean before turning it over and over in his hand while staring at it.

“Was that all?” asked Arisha after a few moments.

“Another thought occurs to me,” said Kerr, looking up. “Tariq told me that there have been a number of security infiltration attempts by, he thinks, the Chinese. Is it possible that they or the South Africans are somehow putting subliminal messages or psychologically disturbing images on the screens in order to sabotage our morale?”

“I have no idea,” said Arisha after staring at Kerr for a few moments. She sighed. “Of course subliminal messaging is possible which is why it’s banned in advertising since you can use it to make people believe anything that way, given enough time. Shanice, can I interrupt you?”

“Sure,” said Shanice, picking up her bishop.

“Is it possible for the Chinese to be sabotaging our screens by putting subliminal messages on them?” asked Arisha.

Shanice’s hand froze over the board then she turned towards Arisha.

“It’s certainly possible,” she said slowly. “They refresh at 60,000 hertz so there’s plenty of time for something to be flashed up without anyone noticing and it wouldn’t be too difficult to insert something for a few hundred hertz. Interesting. I don’t see how someone could get through our security to do such a thing through the computers without being logged in some way though.”

“So you don’t think it’s possible?” asked Kerr.

“Well there’s more than one way to skin a cat,” said Shanice, putting her bishop down without looking. “Actually, if it was me I’d do it the easy way.”

“Which is?” asked Kerr as Efren gleefully took Shanice’s bishop with his pawn.

“Attack the video cards directly,” said Shanice. “They’re all made in China so God knows what extra circuitry they’re got built in which could be exploited. It wouldn’t be too difficult to set up a transmitter nearby that sends a weak signal to the video cards, at least not down on Mars. It would be more difficult up here, of course, although something could be stuck on the side of the orbiter. You know, that’s an interesting little problem.”

“So is there any way we can check?” asked Kerr.

“Bound to be,” said Shanice cheerfully. “I’ll have a word with Tariq.” She looked down at the board and saw her bishop was missing. “Bastard!”

“You’d taken your finger off,” said Efren. “It was a legal move!”

Chapter Sixteen

“Mar-cus,” called Megan softly. “Come on Marcus, wake up.” She pushed his shoulder gently a few times. Kerr rolled over and opened his eyes.

“Hello,” he said and smiled. “What time is it?”

“Nearly eight,” said Megan. “I’ve made you some coffee. It’s a beautiful day.”

“Thanks,” said Kerr, taking the proffered mug. Megan drifted backwards and turned to open the fridge door. “Would you like lamb for dinner or chicken?”

“Oh chicken, I think,” said Kerr, sipping the coffee. It tasted more like beer and was cold but that was fine.

“One chicken coming up,” said Megan giving him a radiant smile. The sunlight streaming in through the kitchen window glinted off her shiny white teeth even though the window was behind her. She seemed to have a lot more teeth than usual and they were longer than they had been but that was fine too. Megan had always been fashion conscious and doubtless her nakedness was the current fashion. Her long blonde hair was braided as well so she must have grown it overnight. She pulled a chicken out of the fridge and dumped it on the wooden table. It squawked a couple of times then squatted and laid a couple of oranges before walking over to settle itself comfortably in the roasting dish.

“There’s a good little chickie-wickie,” said Megan lovingly, patting it on the head. She was now wearing a storm trooper’s uniform with ICE emblazoned across her chest and had an SS armband and black leather gloves but the chicken didn’t mind as it was now a leg of lamb. A small jar of thyme wafted across the kitchen and disgorged its contents over the lamb in a cloud of green dust.

Kerr threw back the bedclothes and got out of bed. He was wearing a loose jumper suit in pale yellow and adorned with little white rabbits.

“Oh good, he said, looking down at himself. “Mum found my diving suit.”

“She’s a wonderful lady,” said Megan, opening the oven door and sliding the roasting dish inside. “Are you going out on your boat today?”

The lamb squawked like a chicken and jumped out of the oven but Megan didn’t notice. She was filing her nails and humming to herself. In fact she looked more like Arisha now, with her dark skin and shoulder length black hair but the bottle green camisole and shorts suited her.

“No, I don’t think so,” said Kerr. “I really ought to go into the office today.” He walked across the kitchen rather awkwardly as the diving fins on his feet were long and broad which made him waddle more like a duck. He eased the air cylinder strapped to his shoulders so it sat more comfortably then peered out of the window. Old Mrs Watkins was laboriously hauling her garbage bin out to the kerb.

“Is it collection day today?” he asked, turning back to look at Arisha who was now smoking a large cigar.

“I hope so,” said Arisha, blowing out a cloud of blue mosquitoes. “There a mountain of garbage outside.”

“Really?” said Kerr. He turned back to look through the window and old Mrs Watkins was now dragging her garbage bin up the side of a deep hole in the ground. “Oh yes, so there is.”

He turned back, pleased to note that he was now wearing his Vanofov Corporation uniform underneath his red swimming trunks then scowled to find Megan had gone.

“Where are you, my petal?” he called.

“I’m over here,” called Megan although she sounded more like Kataline. “Come and look at this.”

“Coming,” called Kerr. He strode across the kitchen and flung open

the kitchen door expecting to see the front lawn and the road beyond. Instead the entire front yard and the sky above it was filled with static. Black and white wavy lines sparkled everywhere and the air was filled with a faint hissing, buzzing sound.

“Bugger!” said Kerr irritably. He lifted the remote control in his hand and pressed Play. The static faded to white and the sound of faint distant voices hovered on the edge of his hearing. The remote control turned white as well and, as he watched, his hand slowly turned white and disappeared into the general whiteness.

A deep wave of anxiety swept over him and he turned to look back at the kitchen. That too was white. In fact everything was white, including himself. He slapped his hand against his leg and felt the sharp sting of the impact but he couldn't see his arm or his leg.

“Oh God!” he exclaimed, feeling his face as the anxiety changed to fear. “What's happening to me?” His face felt strange and contorted then he realised he was screaming.

“Shut up!” he cried, trying to drown out his own screams in panic. “Shut up! Shut up!”

He started to run, ripping at his own face, tearing off long strips of flesh and throwing them aside. One had an eyeball attached but he didn't notice. His blood splattered redly across the whiteness then turned to white as well. Pools of white on white.

“Ooof,” he exclaimed as he ran into a solid patch of white and fell backwards. A tiny crack appeared in the white, a thin jagged line of mid-grey and a little blackness oozed out. Terrified he backed away as the crack lengthened and widened and a sense of overwhelming evil overcame him. He scrabbled round on his hands and knees and tried to scurry away but the solidity of the whiteness, now with a crazy reticulation of grey cracks stopped him.

Then a chunk of white fell away to reveal a glistening orb of black. Like an eye. Shot through with thin red streaks. Watching him.

“Who's that?” he screamed, trying to scabble backwards away from

the eye. "Who are you? What do you want?"

A gong pulsed, making the red streaks in the eyeball pulsate disgustingly with it.

"Your 09:00 alarm call," said the eyeball and burst.

"What the hell?" demanded Kerr, his eyes jerking open.

He was pressed hard against the wall. His entire body was tense, his heart was pounding and his breathing was rapid and jagged. His nose and chin hurt from where they were jammed against the wall. He jerked back then used his hands to roll himself over and levered himself into a sitting position on the edge of the bed.

"Bloody hell," he muttered and wiped his face. It was covered in sweat. In fact his entire body was covered in sweat and his legs felt weak and jittery.

"Jesus," he muttered looking at his wet hand. "Je-sus!"

He looked up and was relieved to see that the room was his quarters on the orbiter. The view screen on the desk gently flashed 09:00 then changed a moment later to 09:01.

"Your 09:00 alarm call," repeated the computer, a little more loudly.

"Dismiss," said Kerr. He felt exhausted but made himself stand up. He stood for a few moments on shaky legs then slumped back down again on the side of the bed.

"I must have had a nightmare," he muttered. "God, it seemed real though. And Megan, those teeth! Jesus. Why would I be having a nightmare about Megan and the house in Perth? And why was she cooking meat? She never ate meat. That was weird. Freaky."

He got up again and his legs felt stronger. Strong enough to walk so he headed for the sanitation unit. A couple of minutes later he emerged, refreshed, clean and sweat free. He walked over to the desk and sat down, his elbows on his knees.

"It seemed very real," he muttered, thinking about the dream. His anxiety was dissipating but hadn't yet entirely gone. "The kitchen was the same although the window was in the wrong place. It should have been on the other side of the kitchen. And why did Megan's teeth grow? Why did she change into Arisha? Was that a lucid dream? Hell, am I still dreaming now?"

He sat back in the chair and pondered for a few moments on how he could decide if he was still dreaming or not. Slowly he raised his hand and tried to push the forefinger of his other hand through his palm. Fortunately it didn't go through and he sat there staring at the tip of his finger pressed hard into his palm for a few moments, watching it turn white.

"I guess that means I'm not dreaming," he muttered. "There was that static again though, and the white with something very nasty behind it. Ugh," and he shuddered.

"You're being a bloody idiot!" he said out loud and jumped up. "Get a grip!"

He did a few energetic knee bends then threw himself on the floor, did ten quick push ups then jumped to his feet.

"Good," he said, feeling a lot better, energised and back in control of himself. "It was just a dream. Coffee and a decent workout, that's what you need."

Four minutes later he was in the otherwise deserted Rec Room wearing a fresh uniform and sipping on a double shot of coffee.

"I must be getting used to it," he mused. "It doesn't taste too bad."

"Computer," he said. "What is a lucid dream?"

"A lucid dream," said the computer, "is one in which the dreamer is aware he or she is dreaming and in many cases the dreamer is able to affect the outcome of the dream. Insufficient research has been carried out on lucid dreams as they are difficult to predict and thus research. The nature of a lucid dream may be good, bad or terrifying."

Do you want a summary of the research to date?"

"No," said Kerr. "End request."

"So it wasn't a lucid dream," he thought, cradling his mug in his hand. "I had no control over what was happening. Then again, I didn't try. I just reacted. I wonder why Megan turned into Arisha? Maybe that was me subconsciously controlling the dream since Megan is history and Arisha is here now. Maybe that's why Bethany and Robbie weren't in the dream since you'd expect our kids to be there even though we broke up twelve years ago. Jesus, am I subconsciously dreaming about Arisha? That's definitely not the way to go. Maybe that's what all the static and the evil behind the white means, don't get involved with Arisha. Hmm. I wouldn't anyway. That way lies trouble. Never shit in your own nest as my dad used to say. Good solid advice that."

He finished his coffee and got up to get another.

"Computer," he said, returning to his chair. "Any messages for me?"

"Four," said the computer. "One personal and three corporate."

"Put the personal one on the main screen in the Rec Room," said Kerr.

"Hi Magnus," said Megan, appearing on the man view screen. She looked a lot older than she had in his dream and she was conservatively dressed in a blue shirt. Her hair was longer too and not as blonde as it used to be although her teeth were normal sized. "Beth's graduating next week. Will you be around in September for her graduation ceremony? Get back to me soon as she needs to book seats."

"Shit!" exclaimed Kerr. He'd forgotten Bethany was almost at the end of her studies. Maybe that was why he'd had that dream? Then again, wouldn't he have dreamed about Bethany rather than Megan? He sat up straight and tweaked his shirt smooth.

"Computer, reply," he said.

“Ready,” said the computer and the little light above its camera started to flash.

“Hi Megan,” said Kerr. “How are things? You're looking well. I'm on Mars at the moment and I don't know if I'll be back by September but if I am I definitely want to go to Beth's graduation ceremony. I suggest you book a seat for me anyway. Tell Beth I love her and I'm desperately proud of her. I'll send her a personal message soon. Message ends. Send.”

“Sent,” said the computer.

“Right,” said Kerr, feeling a little homesick. He hadn't been able to get to see his kids as his transfer to Mars had been at short notice. “Display the corporates, oldest first.”

* * *

“Good morning Arisha, Rikki, Efren, Shanice,” said Kerr, as the hatch to the Control Room opened.

“Morning,” they chorused.

Rikki was bent over her console and Efren had his feet on his console and was reading a note book. He quickly dropped his feet to the floor and sat up. Shanice was setting up a camera on a tripod behind Rikki.

“So, how is the move going?” asked Kerr, going over to stand beside Arisha. He'd noted Efren's feet and the speed with which he'd reacted at Kerr's appearance and decided not to make an issue of it beyond looking stonily at Efren. Efren went slightly pink and started to scan his screens.

“Surprisingly well,” said Arisha. “The grinder didn't get tangled this time and only three joining pins in the central core have been damaged so far.”

“I'm glad to hear it,” said Kerr. “Kataline didn't seem overly optimistic yesterday. When did they start?”

“Two minutes after ten,” said Arisha, standing up. “Computer, Anari signing off.”

“Computer, Kerr taking control,” said Kerr as they changed places. “So they’re, what, a third of the way through?”

“Yes,” said Arisha. “Rikki’s landing the last but one shuttle as we speak and the last will land in twenty minutes or so. None have launched since ten and Efren is handling the last coming up. It’s not due for another twelve minutes.”

“Excellent,” said Kerr. “So am I right in thinking that’s it for us until the bore starts up again in the new location?”

“That’s right,” said Arisha. “All being well that’ll be in about four hours. Kataline will give us plenty of warning though.”

“Good,” said Kerr, looking over at Shanice. “What are you doing Shanice?”

“Hmm?” said Shanice, looking up from the screen of her camera. “Oh, I’m filming Rikki’s screen.”

“I can see that,” said Kerr. “Why?”

“To check for subliminal messaging,” said Shanice looking surprised. “As you said.”

“Ahh,” said Kerr. “I rather expected some software solution to that.”

“I discussed it with Tariq,” said Shanice. “He doesn’t think it’s likely and he wasn’t certain he’d be able to write an app to capture the video RAM data accurately in real time. I have to agree as it’s entirely possible that if anyone is subverting the video data then they may have built in security precautions that block monitoring software. This high speed camera seemed the simplest solution as it’s completely independent of the computers and as we’ve never had to use it before it’s a good opportunity to test it as well.”

“I see,” said Kerr. “Are you intending to only monitor Rikki’s screen?”

“No,” said Shanice. “We’re going to record every monitor in the orbiter randomly for ten minutes each time over the next two days. That way if there is an attack going on we’ve a good chance of isolating it if it’s limited to certain times and systems. If we detect anything then we can concentrate on those screens.”

“Sounds like a workable plan,” said Kerr. “Will you be reviewing the recordings directly or getting the computer to do it?”

“The computer,” said Shanice. “Doing it by hand would be way too boring so we’d probably miss something subliminal, especially as the recordings would have to be played back at one hundredth speed.”

“Makes sense,” said Kerr. “And I daresay if an intruder can manipulate the review of these recordings then they’ve already got full access to our computers anyway. Good, carry on.”

“Yes, Kerr,” said Shanice.

“Right, well I’ll be off,” said Arisha. “Unless you need me for anything?”

“Actually I do want to talk to you about a matter,” said Kerr. “I had a message this morning from Business Development. It seems that the company is tendering for a major waste disposal project and they want our input.”

“We produce very little waste,” said Arisha, frowning, “and most of that is recycled. What does this have to do with us?”

“Quite a lot, it seems,” said Kerr. “Apparently concerns have been raised by environmentalist groups over the amount of material that’s being mined both here on Mars and on the Moon and transported to Earth. We alone account for some 35 million tonnes a year and the Chinese operation on Mars is about the same. That combined with the output from the various Moon mines amounts to somewhere in the region of 400 million tonnes a year, all of which is going to Earth. That means that Earth’s net mass is increasing which is, according to the environmental scientists, affecting the Earth’s orbit around the Sun and the Moon’s orbit around the Earth.”

"I wouldn't have thought it would have much effect," said Arisha, looking puzzled. "I don't know offhand the mass of Earth but it must be in the hundreds of billions of tonnes, if not trillions. A few more million wouldn't make a lot of difference."

"That's per year," said Kerr. "Long term 400 million tonnes a year amounts to a lot of new material being added to Earth's mass and that's to say nothing of future mining on other planets. Apparently the Earth's orbit has already decreased by three thousandths of a second and it can only get worse. And, they tell me, as the Earth gets closer to the Sun the temperatures on Earth will increase."

"Well, OK," said Arisha. "I still don't see what it has to do with us though."

"Well, Vanofov's plan," said Kerr, "which is the basis of the tender, is to use the freighters we already have returning to Mars and the Moon which are currently empty to carry Earth's waste for dumping in the disused mines. That way the net transfer of mass will be virtually zero. The company bean counters are working on the figures now but they project it could be very profitable. Very profitable indeed. They also tell me that only Vanofov, Kantan Kaifa and Australia's Artemis Luna have a scale of operations and the relevant expertise to undertake a project of such size."

"Surely they're not planning to dump all Earth's waste on Mars?" asked Arisha.

"My understanding is that it will be split in proportion to the extractions from Mars and the Moon," said Kerr. "So consequently the bulk, a little over three quarters, will be going to the Moon."

"Hmm, OK," said Arisha, still frowning in puzzlement. "But I still don't see why we need to be involved in the tender. Surely that's a matter for Head Office, not the mine itself?"

"I'm inclined to agree with you," said Kerr, "but they've requested our input as well. I can't imagine why since they never involve the individual deep sea rigs in such decisions on Earth."

“It’ll be the environmental aspect, I expect,” said Shanice offhandedly, straightening from setting up her camera.

“I wouldn’t think anyone on Earth would care about the Mars environment,” said Arisha.

“Maybe not,” said Shanice, “but Vanofov would. So would Kantan Kaifa and Artemis Luna on the Moon.”

Chapter Seventeen

"I'm not entirely clear on this," said Kerr, frowning. "Why would the Vanofov Corporation be concerned about the environmental aspects of dumping waste? They're a mining company."

"Only in part," said Shanice. "There, that looks to be working properly. Be careful when you roll back, Rikki."

"Will do," said Rikki, glancing over her shoulder at the camera.

"I suppose you mean all the other operations Vanofov have their fingers in?" asked Arisha.

"Yes," said Shanice, walking over to join her and Kerr. "Who knows what future plans they have for colonisation. Maybe even setting up manufacturing plants or an inter-stellar base. They're not just mining and the same goes for the Chinese. Maybe even the Americans too if they ever get their act together."

"Well, that's a fair point," said Kerr, "but environmental issues?"

"That's right," said Shanice. "I did a semester of environmental engineering as part of my training. Waste is a hell of a problem."

"You're not making things clearer," said Kerr, a touch harshly. "Explain your point."

"Waste degrades and decays," said Shanice, scowling. "All sorts of problems arise as toxins leach into the surrounding soils, water gets contaminated, gases build up and there may even be radioactive contamination if they're planning on sending up radioactive waste."

"Does that really matter?" asked Kerr. "After all, the waste will be three kilometres below the surface."

"Only what's at the bottom, not at the top," said Shanice. "What we're talking about here are three kilometre high cylinders of waste surrounded by a variety of rocks and other materials. Aside from anything else a buildup of, say, methane in that cylinder could lead to

massive explosions which could significantly impact a wide area, potentially even destabilising the rock structure which could impact mining. It might even cause the cylinder to act like the barrel of a gun and fire a few thousand tons of waste into space which could easily interfere with shuttles and anything orbiting. Falling debris could be scattered over half the planet which could be catastrophic for any settlements.”

“Are you serious?” asked Arisha.

“Very serious,” said Shanice. “And that's not the least of it. Despite regulations on Earth there have been any number of instances of landfills creating unexpected toxic gases and liquids such as nitric and sulphuric oxides which leach into the surrounding areas and these things can seep a hell of a long way in fifty or a hundred years.”

“But surely that wouldn't be an issue here?” asked Kerr. “Mars is huge.”

“As I said, it depends what the plans for the future are,” said Shanice. “If the idea is simply to mine everything on Mars and replace it with garbage then it doesn't really matter but it won't be pleasant if they later decide to build a colony or whatever. It'll be the same as building a town on top of a garbage dump then being surprised when people die.”

“Not to say immoral,” muttered Rikki, keeping her head bent over her screens.

“What was that, Rikki?” asked Kerr, looking over sharply.

“Oh nothing,” said Rikki, looking up with a smile. “Just talking to myself, that's all.”

“Hmm,” said Kerr. He pursed his lips then looked back at Shanice. “You were saying?”

“Another problem's heat,” said Shanice, scraping her memory for what had been talked about during her environmental engineering unit. “Three kilometre deep waste is going to generate phenomenal

amounts of heat as it decomposes. Granted there isn't a lot of oxygen in the atmosphere but there is trapped inside the rocks so fire could also be a major issue and that could further affect the structural integrity of the surrounding rock. Especially if contaminants have seeped extensively then catch fire. You could end up with hundreds of square kilometres of sub-surface contaminated rock burning with no means of access to control the spread or put out the fire."

"I can see that would be a problem," said Kerr. "Rikki, did you say something about it being immoral?"

"Umm, kind of," said Rikki. "I guess. Maybe."

"What did you mean?" asked Kerr.

"Umm, well, nothing really," said Rikki, staring at her screen. "Umm, it's just that, well ... umm it seems to me to be wrong, that's all. OK we're mining Mars heavily but that's not the same as filling it with trash and polluting the whole place, is it."

"So you're worried about the wildlife on Mars, are you, Rikki?" said Efren, mockingly. "Don't. There isn't any."

"Well, maybe not," said Rikki, going a little pink, "but I still think it's wrong to pollute the entire planet."

"I don't think they're talking about the entire planet, Rikki," said Kerr. "Just filling in the holes we're digging."

"Well, I guess," said Rikki with a resigned shrug.

"Actually, life could be an issue," said Arisha thoughtfully.

"There isn't any life on Mars," said Kerr, "or so everyone tells me."

"Perhaps not yet," said Arisha, "but if human waste and very likely animal waste as well is dumped up here then it will inevitably be full of microbes, bacteria and probably insect life. Massive cylinders of hot decomposing waste protected from the external environment could act like giant test tubes and petri dishes. Who knows what will evolve

given time.”

“I don't imagine human waste will be dumped,” said Kerr. “Won't that go through the sewage systems in the normal way?”

“Actually I was thinking of living cells left on cooker knobs and vehicle seats,” said Arisha, “although undoubtedly sanitary pads, bandages, clothing, bedding and so on will end up here and, of course, anything that's fly-blown or infested with eggs from bed-bugs, lice and what have you. Very probably things that have been infected as well.”

“I don't imagine hospital waste will be included,” said Shanice. “They have special systems for that.”

“A lot of people with infections don't go to hospital,” said Arisha. “They deal with them at home then throw their waste in the garbage. Tissues and handkerchiefs, for example, or bloody rags and condoms and so on. Potentially we could be creating a perfect breeding ground for newly evolving species of infections, especially as there'd be no natural predators.”

“Hah!” sneered Rikki, glancing at Efren.

“Hmm, there's a lot more to this than I first thought,” said Kerr. He scratched his cheek thoughtfully. “Surely this would be for specialists on Earth to consider though, not us?”

“You'd think so,” said Arisha. “Perhaps they're really asking us about the logistical side. After all, we'd need a lot more manpower and machinery. It would be asking too much for existing staff to process all the waste as well as continue to mine effectively.”

“Yes, I imagine that's the case,” said Kerr. “Perhaps we could get together with Kataline over the next few days, think through the logistical side and come up with some figures. I can mention the other points that have been raised but Head Office likes numbers.”

“Certainly,” said Arisha, “although I was thinking I might visit the mine over the next few days. Once things have settled down after

moving the bore.”

“Ahh, yes,” said Kerr, nodding. “Good thinking. That’s important. Right. I suggest you visit the mine the day after tomorrow which will give Kataline a day to check everything’s working as it should. Perhaps you could have a preliminary chat with Kataline about the waste proposal while you’re down there and we can all get together to formalise some response after your return.”

“As you wish,” said Arisha. “Do you need me any more?”

“No,” said Kerr. “That’s all for now.”

“Good,” said Arisha.

She glanced around then turned and put her hand on the ladder.

“Oh yes, I’ve been meaning to ask,” she said, turning back. “Have you found anything interesting in the management logs?”

“No,” said Kerr, looking up from brooding over the waste proposal. “I’ve finished going through the last three months and everything looks to be perfectly routine, aside from the Hugh Lamont incident of course.”

“That doesn’t surprise me,” said Arisha. “Log entries tend to be routine in themselves and it’s quite easy to disassociate yourself when making them.”

“I appreciate that,” said Kerr, “and I dare say anything overtly anomalous would have been picked up by Head Office although their reviews would be routine as well and quite possibly superficial. Still, it was a useful exercise as I am now quite familiar with the routine here and there was a small chance that a fresh pair of eyes might have spotted something.”

“Indeed,” said Arisha. “Good night.”

* * *

“Shuttle 7's now landed, Kerr,” said Zara, two days later. “Kataline is transferring Arisha to the transport and they'll be in the Mine Base in approximately thirty minutes.” She was still a little wary of Kerr and made sure she always addressed him by name whenever she spoke to him. It wasn't that often as she wasn't in Kerr's team but with Arisha absent, Kerr was officially covering her duty.

“Good, thank you, Zara,” said Kerr.

Once Arisha had accepted the potential benefits of her personally visiting the Base she'd been quite willing to go. After all, it gave her a chance to meet new real people as well even though everyone at the Base was well known to her. Face to face telecommunications lacked a little something even though no one quite knew exactly what.

“Incoming message, Kerr,” said the computer.

“Display,” said Kerr and leant over to read the message on the screen beside him. “Ahh, excellent. Computer, acknowledge receipt.”

He leaned back in his chair and watched Arlo and Zara for a few moments. Despite Kataline's misgivings, the transfer of the bore to its new location had gone with only a couple of minor hiccups and mining had proceeded quite smoothly. In fact, the rock in the current location was relatively soft and boring was going quite quickly. The grinder was already almost one hundred and fifty metres down although seismological readings suggested they were getting close to a layer of very dense rock which would slow them down considerably.

“Zara,” said Kerr.

“Yes, Kerr?” said Zara, her brow creasing with anxiety in case she'd made a mistake or something.

“When next you speak with Kataline,” said Kerr, “could you tell her that the paint supplies and other decorating materials for the Base will be on the next freighter and should be at the orbiter in a little over three days.”

“Yes, Kerr,” said Zara. “Three days, yes.”

“And we will, of course, send the items down on the next shuttle,” said Kerr. “There’s quite a lot of paint and wall hangings so they’ll be in a container rather than boxed inside the shuttle itself.”

“Yes, Kerr,” said Zara.

“Any update on when we’ll get our paint?” asked Arlo.

“Not yet,” said Kerr, “but I imagine it won’t be too long. I’m a little surprised they’re not sending that in the same container.”

“Probably because it would mean us having to open the container and separate the loads,” said Arlo. “Sending it in two batches saves on the separating and the re-sealing of the container.”

“That’s a good point, Arlo,” said Kerr. “Although they could send ours in another container in the same chain. No matter. It will be here soon enough. Right, I’m going to get some food and take a nap. Call me if you need me.”

“Will do, Kerr,” said Arlo, tapping his forehead with a finger in an imaginary salute and pointing the finger at Kerr.

He watched Kerr ascend the ladder and the hatch close.

“As if we’ll need your help for anything,” he said, a little contemptuously.

“Don’t say things like that,” said Zara anxiously glancing at the hatch. “He’ll hear you or read the voice logs or something.”

“So?” said Arlo, turning back to his screens. “What’s he going to do about it anyway?”

“I don’t know,” said Zara as the hatch slid back open, “but why go looking for trouble?”

“Who’s looking for trouble?” asked Kerr, sliding back down the ladder.

“I am,” said Arlo, breezily. “Slight stutter in the starboard thruster of shuttle 19. I’m checking it out now.”

“Is it serious?” asked Kerr, walking over.

“Not at all,” said Arlo, quickly bringing up the data for shuttle 19. “No, everything checks out. Most likely a particle or two of dust in the propellant. It happens every now and then. That dust gets everywhere.”

“Good,” said Kerr, glancing over the screens. They were as incomprehensible as always. “I forgot my coffee mug.”

He picked up his coffee mug and climbed the ladder again.

“Murkha!” muttered Arlo as the hatch slid shut.

“What?” asked Zara.

“It’s a Konkani word,” said Arlo, grinning at her. “Arisha’s language, from Goa. It means ‘idiot’.”

“You’d better hope Kerr doesn’t speak her language,” said Zara, “or she tells him what it means.”

“She won’t,” said Arlo, tracking shuttle 19 as it started its approach to the orbiter. “She’s got more sense than that.”

Kerr put his coffee mug in the dishwasher before browsing through the available food sachets. There weren’t that many and he contemplated going to the stores to get more then decided to leave it to someone else. He studied a sachet of fish pie and a sachet of braised pork in onion sauce then opted for the fish pie and put the pork back. When the pie was ready he took it over to a table and started to scan the news from Earth. Even though he’d only been on the orbiter for eight or nine days the news seemed very remote and irrelevant. Still, a positive was that the share price of Vanofov Heavy Industries was up by 4 cents which meant his personal wealth was now \$1000 more than it had been the day before. On the downside, however, his wealth was still some way off being enough to retire on

and could just as easily diminish a little tomorrow.

“Retire!” he muttered and stood up. “As if.”

He put his empty bowl and cutlery in the dishwasher and started the cycle then went next door to the gym and halfheartedly did his required half hour of exercising. Ordinarily it wasn't a problem but he was feeling a little out of sorts and exercising required a little effort and self-discipline. It helped that he knew the computer would record his presence and that Arisha would take him to task at some point if he didn't exercise.

Back in his quarters he got changed into a pair of shorts and sat down in front of his note book on the desk.

“Note book, display Mars Orbiter Operational Procedures Manual,” he said and yawned as the manual appeared on screen, open at the page where he'd left off. The manual was some nine thousand pages long and he was only up to page 34. If and when he finished reading the manual he still had the eleven thousand page Mine Procedures Manual to read. The prospect was rather daunting as the Management Logs, which he'd finished reading, were an enthralling thriller in comparison to the Procedures Manuals. He yawned again and tried to focus on the overview of the orbiter's robotic cleaning system and its various warning messages and manual overrides.

“Oh for God's sake,” he muttered, jerking back awake to find he was still on page 34. “This is ridiculous!”

“Note book, close Manual,” he said and pushed himself away from the desk.

He got up and decided it was too warm in the room so he got the computer to lower the temperature by three degrees.

“That's better,” he muttered as a slight chill wafted across his skin.

He picked up Hugh's note book, which was still sitting on the desk where he'd left it, and turned it over a couple of times before pressing the power button. After all, there was a tiny possibility that the

security on the note book was time dependent and it might work this time.

“Authorised Access Only” flashed slowly at him in red.

“Maybe I should get Tariq to have a look at it,” he thought and powered off the note book. He put it down on the desk again and ran a finger across Hugh's green shoes.

“So why did he never wear them?” he wondered, yet again. “Why bring them up here and never wear them? Seems a strange thing to do.”

He picked one up and stared at it.

“Unless you bought them while you were up here,” he thought. “But why buy shoes when you're in orbit around Mars?”

He slid his hand inside the shoe in case there was something hidden inside. There wasn't and he'd checked at least twice before but hope springs eternal.

“Oh for God's sake!” he muttered and tossed the shoe on the desk again. It bounced and landed sole uppermost. Ever one for neatness Kerr reached down and picked the shoe up, meaning to put it down properly but instead he ran his finger over the black crêpe sole. It wasn't smooth. Instead it was covered in a crazy pattern of little bumps and furrows.

“Well, smooth soles wouldn't grip, would they,” he muttered and put the shoe neatly beside the other one. Still feeling out of sorts he wandered over to the bed and lay down with one arm over his eyes.

“Surely not?” he muttered as a thought struck him. He sat up and twisted around to look at the desk. “No, that's just stupid.”

He lay down again but the thought came back, nagging at him.

“Only one way to find out,” he exclaimed and jumped off the bed. He walked over to the desk and snatched up the note book. He powered

it up and the “Authorised Access Only” flashed mockingly at him.

“Yeah, yeah,” said Kerr tiredly and picked up one of the shoes. He stared at the sole for a moment then pressed the crêpe of the heel against the fingerprint reader on the notebook.

“Unauthorised,” flashed on the screen.

“Oh sod off,” said Kerr irritably and tried the tip of the sole.

“Welcome,” flashed up on the screen.

“Bloody hell!” exclaimed Kerr, nearly dropping the note book in surprise. “It worked! You cunning old bastard!”

Chapter Eighteen

“Note book,” said Kerr, sitting down. “List all files excluding system files.”

“Assignment directive 2083 dash 4113,” said his note book. “Mars Orbiter Operational Procedures Manual, Mine Procedures Manual ...”

“Cancel,” interrupted Kerr, irritated with himself for not realising his note book would respond rather than Hugh's. He picked up Hugh's note book and turned it over to get its serial number.

“Note book serial number AN41332557-TR assign identity Hughbook,” he said, turning the notebook the right way up.

Absolutely nothing happened.

“Note book serial number AN41332557-TR respond,” said Kerr.

Still nothing happened. Kerr sighed.

“Computer, ascertain status of note book serial number AN41332557-TR,” said Kerr, frowning.

“Access denied,” said the computer a few moments later.

“Wonderful,” said Kerr sarcastically. He touched the note book's screen and it flashed to life. Using his finger he selected Settings. The various Settings options appeared on the screen.

“Excellent,” muttered Kerr. “So the thing's working locally at least.”

He chose System then Identity and checked the list of the note book's aliases. 'AN41332557-TR' was awkward to remember and 'Note Book', as he'd already discovered, would cause confusion with his own note book. He manually added the name 'Hughbook' to the list of aliases then went back a level and selected Operations. He noted that both Voice Operation options – for receiving and playback – had been disabled. He enabled both then hesitated before disabling both again. Presumably Hugh had had a good reason to disable both options so,

he reasoned, until he had a better idea of why it might be best to leave them both disabled. Cancelling out of System he selected the Network option and noted that all remote access options had been explicitly denied.

“Interesting,” thought Kerr, tapping a finger slowly on the desk. “He’s blocked all access completely. What did he have to hide?”

Just to be certain, Kerr cancelled out of Network and selected Users. The usual list of system accounts was there, including Administrator, Trusted Installer and so on as well as two others; Vanofov Corp and Shoe. Checking the authorities for Shoe he noted that the user account had full administrative control over the note book.

“So Hugh’s Shoe,” muttered Kerr, smiling. “Cute.”

Unsurprisingly, given that voice control and networking had been blocked, the Vanofov Corp user account had all authorities removed. It was a bit of overkill since anyone using the Vanofov Corp account, such as Tariq, would be unable to access the note book but it did suggest that Hugh had not only been thorough but had been somewhat paranoid as well. Clearly he didn’t want anyone to access the note book at all.

Cancelling out of System, Kerr selected Data and was intrigued to find only a single file was listed, entitled Mars Orbiter Operational Procedures Manual.

“Yeah, right,” muttered Kerr. “As if you’d set up all that security for a copy of the manual.”

He tapped the procedures manual file and was astonished to find that it was, in fact, the exact same procedures manual he’d been reading on his own note book. All nine thousand pages, including appendices.

“Are you kidding me?” he muttered. “All that security for the damned manual?”

He scowled at the note book and chewed his bottom lip as he thought about it.

“No,” he said out loud. “I don't believe it.”

He checked the properties of the Data store and saw that the View Hidden Files option had been disabled so he enabled it and another file appeared. This one was named Mars Orbiter Operational Procedures Manual Copy 2.

“Sneaky,” thought Kerr and opened the file.

It clearly wasn't the procedures manual as it was plain text and only nineteen pages long.

“I've been having some very strange and disturbing dreams recently,” read Kerr, “so I've decided to start writing them down. Quite why I don't know as I don't expect the mere process of writing about them will make them stop but maybe they will. I'm finding I am waking up afraid and perhaps I'm becoming paranoid but I feel that the computer system is monitoring me. Maybe it's Arisha or maybe it's the shrinks in Head Office but whoever it is mustn't find out ...”

Kerr's head jerked up as all the lights in his quarters started flashing and a rising 'woop woop' alarm filled the room.

“What the ...?” he exclaimed just as **!! CRITICAL SYSTEM FAILURE !!** started flashing in bold red letters on the main computer screen and his personal note book screen. The message on the screens flashed in sync with the room lights.

“Shit!” exclaimed Kerr and leapt over to the ladder, knocking Hugh's note book across the desk. The lights in the corridor were also flashing and the 'woop woop' echoed around the corridor. He thumbed the button to open the hatch to the Control Room just as Zara's voice cut into the whooping. “Kerr to Control Room, Kerr to Control Room”.

“What's happening?” shouted Kerr as he slid down the ladder.

“There's been some catastrophe at the mine,” called Zara, rapidly tapping both her screens in an effort to find out what was going on. Arlo was standing in front of his but doing much the same. “All

communications are out.”

“OK,” said Kerr, striding over to the control panels. “First of all, cut off that damned noise.”

“What's happened?” called Rikki from the hatch.

“We're trying to find out,” snapped Kerr as the whooping stopped and the lights and main screen stopped flashing. “Thanks Zara. Now, tell me what you know.”

“Bugger all,” exclaimed Arlo in agitation. “There was a critical failure alert at the drilling core then moments later all the comms went out.”

“I'm trying to make contact,” said Zara, her face tense and pale but her voice under control. “Nothing's working.”

“Are we still getting a carrier signal?” called Efren, sliding down the ladder. He and Rikki moved over to stand beside Arlo and Zara at the controls.

“Umm, no,” said Zara. “No carrier signals from the mine. Correction. There's one carrier signal. It's coming from, ummm, the hydrazine plant but there are no transmissions.”

“Well that's something,” remarked Efren.

“Explain,” said Kerr tersely, very conscious of how little he knew of the systems here.

“If the hydrazine plant had exploded there'd be no signal,” said Efren, glancing at him. “By the sound of it there's been some major failure at the bore itself and it's taken out all the systems at the Base but the plant is still operational.”

“I see,” said Kerr. “Where are our engineers?”

“Umm ...,” said Arlo, flicking through displays on his screen. “They're both in Engineering. Good.”

“OK,” said Kerr, moving over to the screen beside his chair. “Computer, put me through to Engineering.”

“Yes, what is it?” barked Tariq. Both he and Shanice were at consoles, checking displays.

“Have you any idea what's going on?” asked Kerr.

“No,” snapped Tariq.

“Is the orbiter in any immediate danger?” asked Kerr.

“No,” snapped Tariq again. “The problem's at the mine. I'll get back to you.”

“Give me a status update in three minutes,” said Kerr. Tariq ignored him.

“Everyone, stop!” barked Kerr. “We need to remain calm. Arlo, Zara, have you been able to restore communications?”

“No,” said Zara. “There's no response from the plant either.”

“We've got communications with all the shuttles in the air,” reported Arlo.

“And with the shuttle on the launch pad,” reported Zara a few moments later.

“So are we in a position to evacuate the people on the ground?” asked Kerr.

“Probably not,” said Efren, tapping repeatedly on one of Zara's screens. “We can get shuttles down but we won't be able to get them back up.”

“Why not?” asked Kerr.

“The fuelling trucks aren't responding,” said Efren. “If they can't be refuelled we can't get them off the ground.”

“I see,” said Kerr. “So the Mine Base is effectively isolated?”

“Yes,” said Rikki. “Poor bastards.”

“It's too early for that,” snapped Kerr. “All we have so far is a complete communications failure. We don't know yet if anyone is injured.”

“True,” said Arlo, sitting back. He stopped trying to work his screens as very little was happening. A few moments later Zara sat back as well.

“OK people,” said Kerr. “We know there's been a major failure at the bore and that communications with the Mine Base have been lost. The processing plant appears to be intact but may be unmanned. What else do we know?”

“The shuttles in the air are still operative,” said Zara. She leaned forward and opened her main shuttle control screen. “I have shuttles 16, 1 and 14 coming up and ... just a sec.”

“What is it?” asked Kerr as Arlo leaned forward to check his shuttles.

“Shuttle 14 seems to be off course,” said Zara, sounding puzzled. “Yes, it's shifted some two hundred metres to the south and is five hundred metres too high.”

“I have the same with shuttle 33,” said Arlo, frowning. “It's going down but it's been shifted upwards and north.”

“Is there any chance of collisions?” asked Kerr.

“Are you there, Kerr?” called Tariq from the view screen.

“Just a minute, Tariq,” said Kerr. “Collisions, people?”

“No,” said Zara, “shuttle 33's about five kilometres above 14.”

“Good,” said Kerr. “For the moment, you and Arlo concentrate on keeping the shuttles in the air in the air. We can assume the mine isn't

operational so no shuttles will be taking off.”

“What about shuttles coming in to land?” asked Arlo. “It’s a fair bet the mine won’t be clearing the landing pad.”

“Are we able to get any of the shuttles going down back into orbit?” asked Kerr.

“Umm, 4 and 22 are high enough to stay in orbit,” said Zara, rapidly switching between displays. “19 has just enough to get back up into a low orbit but probably won’t have enough to land safely later and 7 is due to land in ... one minute twenty two seconds.”

“Arlo?” asked Kerr.

“16 is still in high orbit and 40 is in low orbit,” said Arlo. “I’ll keep them there. 33’s riding high and I can get her back into a low orbit as well.”

“Excellent,” said Kerr. “Keep all your down bound shuttles in orbit including that one of yours Zara which you can get back up to a low orbit. We’ll worry about landing her later when she runs out of fuel, if she does. Is the landing pad clear for the one that’s about to land?”

“Yes,” said Zara.

“And can you land it?” asked Kerr.

“Assuming there’s no damage to the pad,” said Zara. “I’m not getting any telemetry from the Base but I should be able to manage from the shuttle’s own telemetry.”

“Then do so,” said Kerr.

“Kerr?” called Tariq again.

“Just a minute, Tariq,” said Kerr to the screen. “We’re sorting out the shuttles at the moment. Now, Zara and Arlo. Is there any reason why we can’t bring the upcoming shuttles in as normal?”

“No,” said Zara, looking over at Kerr for the first time since he'd arrived in the Control Room. “Nothing up here's been affected. I suggest we keep the shuttles up here though rather than send them back down.”

“Is that feasible?” asked Kerr. “Have we enough room to park them?”

“It's pretty much infinite,” said Arlo. “Shall I tell the Earth orbiter to hold off on sending the return freighters?”

“No, let's wait and see,” said Kerr. “This could simply been a temporary communications problem and the mine is still working or will be working again shortly. Rikki, Efren, what are you doing?”

“Umm, not much,” said Efren, surprised at being called on. “Zara and Arlo have things pretty much under control.”

“Good,” said Kerr. “I have a job for you. If we assume a worst case scenario and the people on the ground need to be evacuated I want you and Rikki to come up with a plan for how to do it.”

“Actually that wouldn't be worst case,” said Efren. “Worst case would be no one left to evacuate.”

“Fine, second worst case then,” said Kerr. “I don't care. Just find a way to get them out.”

“OK,” said Rikki, pulling on Efren's shoulder.

“And don't forget Arisha's down there as well,” said Kerr. “So there's seven to evacuate, not six.”

“Right,” said Efren. “Come on Rik, let's go to the Rec Room and think about this.”

“Are you there Tariq?” asked Kerr after taking a deep breath.

“I'm here,” said Tariq. “I heard what you said about evacuation. There's only one way it can be done, which is the way laid down in the operations manual.”

“What's that?” asked Kerr, noticing Rikki and Efren stop on their way up the ladder. Clearly they hadn't fully read the operations manual either.

“We can't get all of them out one at a time,” said Tariq. “We'd need seven shuttles to do that and they won't have the fuel and it'll probably take too long as well. If the Base is completely out then the environmental systems will be down so they've got perhaps twelve hours before it gets too cold. Twenty four and they'll be frozen solid. The surface temperature's below minus forty five at the moment.”

“What about air?” asked Kerr. “Won't that be a problem too?”

“No, there's enough air in the Base for several weeks without replenishment,” said Tariq, “although if they use the air locks a lot then that could be depleted quite quickly. Temperature's the main issue.”

“So what do we do?” asked Kerr.

“There should be a shuttle ready fuelled for takeoff,” said Tariq. “If there is then get everyone into an empty container and we can bring them all up in one go. It'll be a bumpy ride as they'll be thrown around a lot but Arisha can fix any broken bones.”

“Zara, Arlo, is there a shuttle ready for launch?” asked Kerr.

“Yes,” said Arlo. “Shuttle 39, but it's already loaded with a full container.”

“Can that be dumped?” asked Kerr.

“Don't need to,” said Tariq. “There should be enough room left inside for a few people. There's just one problem though.”

“What's that?” asked Kerr.

“With the communications out they won't know what the plan is,” said Tariq, “unless they can figure it out for themselves. It's a fair bet none of them will have read the manual.”

“Damn!” exclaimed Kerr and banged his fist on the arm of his chair. “When will we have communications back?”

“No way of knowing,” said Tariq. “The problem's at the Base not here. There's nothing we can do from the orbiter.”

“And if they manage to get communications back they probably won't need to be evacuated,” said Efren.

“We can't guarantee that,” said Kerr, “so we need an evacuation plan. Suggestions, people?”

“Umm, well, one does occur to me,” said Rikki, holding her hand up as if she were still at school. “I don't know if it's possible, though.”

“What's that?” asked Kerr.

“Someone goes down in a shuttle and tells them the plan,” said Rikki.

“Is that feasible?” asked Kerr, frowning. “I thought a shuttle was about to land. Won't that be blocking the landing pad?”

“I landed shuttle 7 a minute ago,” said Zara. “I can't move it off the pad though. Only the Base can do that.”

“Damnation!” exclaimed Kerr, banging the arm of the chair again. “What about the launch pad? Can we land a shuttle there?”

“Yes,” said Zara, “but we can't then launch another one.”

“So you're telling me this is an impossible situation?” asked Kerr.

“Umm, no,” said Arlo. “There is another option. It's dangerous though.”

“What's that?” asked Kerr.

“We land a shuttle beside the landing pad,” said Arlo. “It'll be off the pad but it is possible. The ground should be fairly flat.”

“Then that's what we'll do,” said Kerr. “Is there a shuttle ready to send down?”

“I've got shuttle 4 coming in,” said Arlo. “I can dump its container into orbit.”

“Then do so,” said Kerr. “Is it possible to shorten the transit time?”

“We can cut it by perhaps half an hour,” said Arlo. “We can take it down to the atmosphere faster but it'll have to slow down before it hits or it'll burn up.”

“Hmm,” said Kerr thoughtfully. “No, it isn't worth the risk. We've got several hours so saving half an hour isn't a significant issue at the moment.”

“OK,” said Arlo. “It'll be ready in about two minutes. Umm, you're going?”

“I can't ask anyone else to do so,” said Kerr, getting up from the chair. “And the people in the Base are my responsibility.”

“Oh stop pretending you're a hero, Kerr,” barked Tariq. “You're the worst possible person to send down.”

“Why's that?” demanded Kerr, bristling.

“You have the least experience,” said Tariq. “I don't know what sort of state they're in down there but for certain you'll be nothing but a liability. You have no engineering skills and bugger all experience of Mars or space. I'll go.”

Kerr hesitated. As an experienced manager of deep sea drilling operations he knew a fair amount about emergency situations and personnel management during such situations. He also knew that, to an extent, Tariq was right. His own skills in a situation such as this were limited, but ...

“No,” he said. “The Base could have been destroyed in which case the mission is moot anyway. On the other hand if there are survivors then

the odds are that one or more of the engineers down there are alive so additional engineering skills won't be necessary. Furthermore, there is a possibility that the down-going shuttle could crash beside the launch pad or into the shuttle on the pad and my loss would be less significant than yours. I'll go."

"You're a joker, all right, Mister Kerr," said Tariq. "I'll be in the EVA Base. Let me know when the shuttle's ready."

"I don't think you heard me, Mister Shandie," barked Kerr. "You will stay on the orbiter. That is an order. Do you understand me?"

"You think I care about your silly orders?" demanded Tariq. "You're a waste of space up here and you're too stupid to know it!"

"Tariq," said Kerr, realising that shouting at Tariq's insubordination wasn't going to work. "I think you've forgotten something."

"Ohh yeah? What's that?" demanded Tariq.

"Whatever the problems are may well escalate," said Kerr. "Are you aware that two shuttles were blown off course by whatever happened at the mine?"

"I am aware," snapped Tariq. "What of it?"

"An emergency may well shortly arise on the orbiter," said Kerr. "It may even become necessary to evacuate the orbiter. I want you here should that situation arise."

Tariq stared angrily at Kerr for a few moments then, as he opened his mouth to speak, Zara broke the tense silence.

"There's a signal!" she squealed. "There's a transmission coming in!"

Chapter Nineteen

“Put it on main screen,” barked Kerr.

The screen changed to a mass of static and background hiss filled the room as Zara routed the transmission over.

“Hello? Hello?” said Kerr, staring at the screen. “This is Kerr on the orbiter. Can you hear me? Hello?”

There was a hint of a voice amidst the hiss but any words were not discernable.

“Hello? Can you hear me?” repeated Kerr, raising his voice.

“The signal's gone,” said Zara as the screen went blank and the hiss shut off. The disappointment in her voice was palpable.

“Can you identify where it came from?” asked Kerr, still staring at the screen which was now blank.

“No,” said Zara, “although it was on the frequency used by the EVA suits.”

“I see,” said Kerr, slumping back in his chair. “Zara, try to make contact again on that frequency. Arlo, keep trying the hydrazine plant.”

Obediently both turned back to their consoles.

“So there's at least one survivor,” remarked Efren.

“Don't be negative,” admonished Kerr. “All it means is that someone is trying to contact us using an EVA suit which makes sense if all their normal communications are out. It does not follow that anyone is dead or injured.”

“So why isn't anyone contactable at the plant?” asked Efren.

“Impossible to say,” said Kerr. “And we must not go jumping to

conclusions. Any response, Zara?”

“No, Kerr,” said Zara.

“Hmm,” said Kerr. “Keep trying.” He turned to look at the screen beside his chair. Tariq was still there but was talking to Shanice. “Tariq?”

“I'm here,” said Tariq, turning to face the camera.

“We'll delay sending you down to the Base,” said Kerr. “We'll continue trying to reconnect for fifteen minutes then re-evaluate the situation.”

“So you're sending me down?” asked Tariq, raising an eyebrow.

“Yes,” said Kerr. “You are correct. You will be more useful to the people down there than I will.”

“That's right,” said Tariq. He hesitated then half smiled. “I apologise for saying you're stupid.”

“Apology accepted, Tariq,” said Kerr. “This is a high stress situation and allowances must be made.”

“I've got a signal!” cried Zara. “It's stronger. Putting it on main screen.”

“Can you hear me orbiter?” was definitely discernable this time although the voice was still faint. “This is Arisha at the Mine Base. Can you hear me orbiter?”

“Arisha!” exclaimed Kerr, a wave of relief washing over him. “Yes, we can hear you. This is Kerr.”

“Excellent,” said Arisha. “I'm using the radio in one of the EVA suits but it wasn't powerful enough so I've wired it into a second suit battery.”

“Well done,” said Kerr. “What is the situation down there? Is anyone injured?”

“No one is seriously injured as far as I know,” said Arisha. “I repeat, no one is injured as far as I know but I do not know about Anders at the plant. We are unable to contact him. It seems every system has failed. Environment, communications, controls, everything. We’re in total darkness. Aisley sprained her ankle and twisted her knee when she tripped over in the dark but she’ll be fine.”

“We are still getting a carrier signal from the plant,” said Kerr. “No one is responding but it does imply that the systems there are still operational. Some of them at least.”

“That’s good news, Kerr,” said Arisha, “although Anders could be injured and unable to respond. I’ll tell Kataline when she gets back.”

“Where is Kataline now?” asked Kerr.

“She and Mindy are checking the power lines,” said Arisha. “Gerhard’s taken one of the transports to check the reactor hasn’t been damaged. Kataline said there won’t be a nuclear explosion but it is possible radiation could be leaking.”

“Good thinking,” said Kerr. “Why are you in darkness? Isn’t the battery backup system working?”

“No,” said Arisha. “The backup system’s failed as well. All we have are some torches and the lights in the EVA suits and Kataline won’t let the rest of us use them. They’re for the engineers only. Assuming there’s still power coming through she needs the engineers to get the environmental system up and running again and they’ll need all the torch batteries to see what they’re doing.”

“Wouldn’t it make sense to get the battery backup working first?” said Kerr.

“Kataline said no,” said Arisha. “If they can’t get the backup working before the torches run out then they won’t be able to get the environment system back up and running before we freeze but if the environment’s working then they can fix the backup system in the dark if they have to. It’ll just take longer.”

"I see," said Kerr. "When do you expect Kataline back?"

"Whenever," said Arisha. "Oh, she gave me a message to give to you if I managed to make contact."

"What message is that?" asked Kerr.

"She said once this is all fixed she's quitting," said Arisha. "I think she means it this time."

"Well, we'll have a talk about that when it is all fixed," said Kerr half smiling. "Could you give her a message from me. Well, two actually."

"Sure," said Arisha. "What are they?"

"The first is that I have complete confidence in her ability to restore the Mine Base systems," said Kerr.

"I'm not too sure that'll impress her much," said Arisha, "but never mind. The second?"

"We have an evacuation plan for you all should the need arise," said Kerr.

"Ahh, good," said Arisha. "Hopefully it won't be needed but it's good to know. What's the plan?"

"Everyone is to get to the launch pad," said Kerr, "and get inside the container that's on the pad already. We can then bring you up to the orbiter. We still have control over the shuttle launch system."

"Hmm, that could be a problem," said Arisha. "They may end up using all the power in the EVA suits trying to fix the systems here and there's no power in the containers. Assuming Anders is OK then we'll need twenty hours or so of suit battery power to get all seven of us up to the orbiter and that power could be better used getting the environment system working."

"That is not acceptable," said Kerr. "Tell Kataline that under no circumstances is she to use EVA suit batteries in trying to repair the

Base systems. The EVA suits are only to be used for emergency evacuation.”

“I’ll tell her,” said Arisha. “I don’t expect she’ll be too impressed though.”

“Then remind her that she can’t quit if she’s dead,” said Kerr.

“A bit harsh but a fair point,” said Arisha with a snort. “I’ll tell her.”

“Good,” said Kerr. “Have you any idea what caused all this?”

“No,” said Arisha. “Aisley said she got an alert about the grinder coming loose from the central core then a second or two later everything died. Other than that we don’t know anything.”

“Why would the grinder coming loose blow all the systems in the Base?” asked Kerr. “It’s several kilometres away. Was there an explosion?”

“If there was no one felt it,” said Arisha. “Anyway, an explosion would do damage to the physical structure and we’re protected by rock. I don’t see how it would impact the electrical systems unless, of course, the reactor or the cabling from the reactor has been damaged.”

“Perhaps that’s the case,” said Kerr. “And that would make evacuation even more essential.”

“True,” said Arisha. “Still, we’ll know more when Kataline and the engineers get back. I’ll update you when I know anything.”

“Excellent,” said Kerr. “I suggest to conserve battery life you don’t leave your radio powered up. Make contact with the orbiter every ten minutes to keep us updated.”

“OK,” said Arisha. “Bye.”

“Signal lost,” said Zara a moment later.

“It’s good to know that no one’s hurt,” said Kerr, looking around the

room. Zara, Rikki and Efren were looking solemnly at him and Arlo was focused on his screens. "Except possibly Anders. Any response yet from the plant, Arlo?"

"No, nothing," said Arlo, twisting to look at him. "The carrier's still broadcasting though so it's fairly safe to say there's been no hydrazine explosion."

"Well, that's something," said Kerr. "Tariq?"

"Yes?" said Tariq.

"Did you hear my discussion with Arisha?" asked Kerr.

"Yes," said Tariq. "Perplexing."

"In what way?" asked Kerr.

"Shanice and I were just talking about it," said Tariq, turning to glance at Shanice. "The battery backup system is wholly independent from the main system other than the power feed from the reactor so even if the reactor's out of action the batteries should still be supplying power. The fact that the main systems and the battery backup have both failed implies a massive electrical failure but neither of us can think of any possible explanation given that the structural integrity of the Base hasn't been compromised."

"Arisha said the grinder separated from the core just before the failure," said Kerr. "Could that explain it?"

"No," said Tariq. "The grinder coming loose could easily chew up the grinder and very possibly damage the central core significantly but that would have no impact on the Base itself. What was that, Shanice?"

"I said maybe the grinder coming loose was a consequence," said Shanice, coming into view on the screen, "rather than the cause. Perhaps something happened in or near the bore that caused the grinder to break away and moments later impacted the Base."

“You mean like a shock wave or something?” asked Kerr.

“Yes,” said Shanice. “I’ve no idea what though. We probably won’t be able to tell until we can get inside the bore and see. How far down had they got?”

“Umm, about a hundred and fifty metres, I think,” said Kerr. “Do you want me to check yesterday’s production report?”

“No,” said Shanice thoughtfully. “A hundred and fifty metres. That isn’t much. If there was some significant geological phenomenon that close to the surface it would have shown up in the seismology months ago and they’d have started the bore somewhere else.”

“Unless it was overlooked for some reason,” said Kerr.

“Unlikely,” said Shanice. “Even if the AI analysis failed to spot it Kataline would have. She doesn’t really trust AI and likes to do her own backup checks.”

“But possible,” said Kerr. “Backups don’t always work as we well know.”

“True,” said Shanice. “Do you want me to look over the seismology?”

“Is there anything useful we can do up here to help them down there?” asked Kerr.

“No,” said Tariq. “Not until enough communications have been restored to let us get at their systems. We can’t even look at their logs at the moment.”

“Then it might prove to be a worthwhile exercise,” said Kerr. “At the very least we’ll be able to rule out geological phenomena as a cause.”

“OK, I’ll get onto it,” said Shanice.

“What about an impact?” asked Kerr. “A meteorite or something?”

“We’d have spotted it on the tracking radar,” said Tariq. “Things like

that don't just magically appear. The same goes for a missile strike or similar.”

“A missile strike?” exclaimed Kerr. “Who'd launch a missile strike on us? We're just a mining operation.”

“No one,” said Tariq. “There isn't even a war going on anywhere on Earth either, unless one has started since I last looked at the news. I just mentioned it as you were talking about impacts. I suppose it is possible that Kantan Kaifa or SRD might be trying to put us out of business but I doubt they'd use missiles. Anyway, they'd attack the Base and the orbiter, not the mine shaft.”

“Indeed,” said Kerr, frowning, “although thank you for reminding me about the other operations. I wonder if they've experienced any similar incidents.”

“You can always ask them,” said Tariq flippantly.

“I think I will,” said Kerr thoughtfully. “It would be useful to know how far this extends. It could be that this was planet wide rather than just a local event.”

“So you're planning to evacuate them as well, are you?” asked Tariq.

“It would be the humanitarian thing to do if they are experiencing similar difficulties,” said Kerr. “In fact it might be an idea to alert them in case we need additional assistance should our situation worsen.”

“It would take too long for either of them to reach us overland,” said Tariq. “They could divert one of their shuttles but they'll have the same difficulties landing that we will until the pads are cleared.”

“And it's difficult to see what assistance they can provide that we on the orbiter can't,” mused Kerr. “Perhaps I'll leave it for now. And, once things are running again in the Base, if it transpires that the cause was some external agency we can make enquiries later. There's no immediate reason to alert them to our difficulties.”

“And they might leak the information to the media,” said Tariq.

“You mean in order to cause the share prices of Vanofov to drop?” asked Kerr, raising an eyebrow.

“Yes,” said Tariq. “If Vanofov Exo-Planetary Mining is known to be in serious difficulties then the share price could drop significantly which would allow Kantan Kaifa or whoever leaked it to buy heavily anticipating the price to go back to normal once production resumes. They might even be able to get a controlling interest.”

“Do all engineers think the way you do?” asked Kerr.

“No,” admitted Tariq, “but I am the Security Officer and this is a security issue, or it will be if there is a hostile takeover bid.”

“So do you think that would be sufficient justification for an attack of some sort?” asked Kerr, pursing his lips. “The shutdown of our mining operation as part of a financial scam?”

“It's possible,” said Tariq, grimacing, “but very unlikely. The South Africans wouldn't bother, they're too small, and the Chinese would expect us to keep it quiet at least until we're in a position to resume production and possibly not even then. Besides, they know Alexander Vanofov would do something as bad or worse in retaliation. There's no love lost between Alexander and Li Xian Ching.”

“Who's Li Xian Ching?” asked Kerr.

“CEO of Kantan Kaifa,” said Tariq. “Rumour has it that Alexander seduced one of Li Xian's favourite mistresses in retaliation for being outbid for Kowloon Electronics back in the 2060's and that Li Xian's never forgiven him.”

“Are you serious?” asked Kerr, frowning.

“Yes,” said Tariq. “Like I said, it's just a rumour but the girl was married off soon afterwards to a minor executive in Kantan Kaifa's division in Tibet and she's been there ever since. She'll be in her early forties now and I hear her applications for a Chinese resident re-entry

permit keep being rejected.”

“I’m not entirely sure I believe you,” said Kerr, “but I accept the possibility of the news of our predicament leaking and impacting the company’s stock market valuation. I’ll delay informing Head Office until we are reasonably certain of when we will be able to restart production.”

“Sensible,” said Tariq. “Head Office won’t forgive you for going off half-cocked.”

“Indeed,” said Kerr. “That I already knew. I’ll talk to you again when I have more information.”

He broke the connection and looked around. There was a strange atmosphere in the room, almost one of anti-climax. It was as though Arisha’s communication that all was well despite the systems failures had somehow brought an impending disaster to an end. It hadn’t, of course, as there was still plenty that could go wrong but the element of unknown had changed into an element of uncertainty and the period of waiting with no way to assist was just beginning.

“Arlo, what’s the status of the shuttles blown off course?” asked Kerr. He frowned as he realised what he had said. ‘Blown off course’. That implied something had impacted the shuttles or was it simply coincidence? A weather event that just happened to coincide with the mine shutdown?

“I’m bringing shuttle 33 back up,” said Arlo. “It’ll be high enough for a stable orbit in about 25 minutes. Shuttle 14 was coming up anyway and is back on course. It’ll reach the orbiter in about one hour fifty.”

“Excellent,” said Kerr. “Are you able to work backwards and tell me where both shuttles were in relation to the mine when they went off course?”

“Umm, sure,” said Arlo. “Give me a few moments.” He bent over his console and started tapping busily.

“Zara, when’s Arisha due to check in?” asked Kerr.

"In about two minutes," said Zara. "There's no signal as yet."

"Why are you two still here?" asked Kerr, noticing Rikki and Efren standing near the console.

"Um, we're waiting to find out what's happening," said Rikki. "Or did you still want us to come up with an evacuation plan?"

"That doesn't seem necessary now," said Kerr. "This is your rest period but I don't imagine either of you can sleep?"

"Could you?" asked Efren. "This is your rest period too. Surely you don't want us to go?"

"True enough," said Kerr, smiling. "No, you can stay. Perhaps one of you could go to the Rec Room and get me some coffee?"

"I'll go," said Rikki. "Anyone else?"

"Not for me, thanks," said Zara just as Arlo asked for some cold water.

"I'll be back in a few moments," said Rikki and started to climb the ladder.

"I'm getting a signal," announced Zara just as Rikki pushed the button to open the hatch. She stayed at the top of the ladder so she could hear. "Routing to main."

"Hello, Kerr?" came Arisha's voice. "Are you there?"

"Hello, Arisha," said Kerr. "What's happening?"

"We've found Anders," said Arisha. "He is uninjured. Gerhard found him on his way to the reactor. When the Base failed Anders tried to reach the Base on the radio and when he couldn't he headed back to investigate."

"On foot?" asked Kerr, surprised.

“Oh no, in one of the transporters,” said Arisha. “He kept trying to make contact via the transporter’s comms link but we’ve had our radios off to conserve the batteries.”

“Good,” said Kerr. “Where is he now?”

“About ten minutes away,” said Arisha. “He also confirmed that whatever has happened hasn’t affected the plant.”

“Excellent,” said Kerr. “Has Kataline returned?”

“Yes,” said Arisha, “although she’s gone again. It seems that there is full power to the Base from the reactor although we haven’t heard yet from Gerhard. However, Kataline told me to tell you that the chips on every circuit board they’ve checked so far after the junction where the power reaches the Base has been fried.”

“What does that mean?” asked Kerr, staring at the wall as he concentrated on Arisha’s faint voice.

“I’m not sure,” said Arisha, “but Kataline seems to think that we’re going to have to replace every single circuit board in the Base which could take forever.”

Chapter Twenty

“Are you serious?” demanded Kerr. “Every circuit?”

“That's what Kataline said,” said Arisha.

“Well, OK, we'll have to go with that then,” said Kerr, his mind focusing on problem solving. “Do you have sufficient spares down there?”

“Of course,” said Arisha. “Both the Base and the orbiter have to be entirely self sufficient as it can take days for parts to arrive from Earth. Don't forget we have 3D printers in both locations which can print new circuit boards and chips as well.”

“But presumably the printers down in the Base aren't operative,” said Kerr.

“I imagine not,” said Arisha, “but I also imagine that getting those working will also be a priority. Fortunately the shuttles haven't been affected so things can be printed on the orbiter and sent down if needs be.”

“Good point,” said Kerr. “I'll warn Tariq and Shanice. It'll probably be a good idea to order more raw materials from Earth as well so there's no possibility of running out. Is there anything else we can do up here to assist?”

“I confess I don't know enough about the systems here to say,” said Arisha, “and I don't want to interrupt Kataline at the moment. She's, ah, a little stressed.”

“I can imagine,” said Kerr, having been through a couple of 'major incidents' on the rigs he'd worked at. “Is she coping?”

“Yes she's coping very well,” said Arisha, “although it's good that I happened to be down here at this time. I'll keep a close eye on her and the others so they don't push themselves too hard and make sure they get rest when they need it. Kataline in particular is the personality type to push herself too hard which can be counter-

productive.”

“Indeed,” said Kerr, “and that can lead to mistakes. Right. I’ll send Tariq down to assist which will relieve some of the pressure and speed things up.”

“That would be helpful, I’m sure,” said Arisha. “The rest of us are feeling entirely useless at the moment.”

“As are we up here,” said Kerr. “I’m tempted to send Shanice down as well but I’m reluctant to leave the orbiter without an engineer.”

“Yes, that would be foolish,” said Arisha. “Right, I’ll go and find Kataline and tell her about Tariq.”

“One question before you go,” said Kerr. “You said you are using the radio from one of the EVA suits?”

“That’s right,” said Arisha. “Actually the one I came down in.”

“Ahh, is that because it’s the only one working?” asked Kerr.

“No, it’s because it was the one at the front of the rack,” said Arisha. “Why?”

“I’m puzzled as to why whatever it was that happened took out the circuits throughout the Base but not the circuits in the suit’s radio,” said Kerr. “Do the other suits work?”

“Hmm,” said Arisha. “Interesting. Give me a moment.” There was a lengthy pause before she came back. “Yes, they seem to be. Certainly they powered up although I haven’t checked their systems individually. Do you want me to?”

“The mere fact they power up suggests their circuits are intact,” said Kerr, “but it would be a good idea to check each one individually. We may yet have to evacuate you all so knowing the suits are operative will be reassuring if nothing else.”

“Indeed,” said Arisha, “and it’ll give Sasha, Aisley and me something

useful to do. Good. Anything else?”

“No,” said Kerr, “but keep me informed.”

“Of course,” said Arisha.

“Signal lost,” reported Zara.

“Computer, connect to Engineering,” said Kerr. “Hello, Shanice. Is Tariq there?”

“He's in the stores,” said Shanice. “Can I help?”

“I've had an update from the Base,” said Kerr. “It seems at this stage that many if not all the chips and circuit boards have burnt out which may well mean additional chips and boards will need printing up here.”

“We're already onto it,” said Shanice. “Tariq's getting print resins from the stores ready to send down and I'm cleaning our printer nozzles.”

“Excellent,” said Kerr. “Tell Tariq when he comes back I'm sending him down to the Base to assist in repairs. He can take the resins down with him.”

“Will do,” said Shanice. “Do you want me to go as well?”

“No,” said Kerr. “That's no reflection on you, of course. We need an engineer up here in case a situation arises and Tariq has already offered to go down to the Base.”

“I understand,” said Shanice. “I can also manage the printers down in the Base from up here once communications are restored which'll free up the engineers. Sasha and Aisley should know how to load and unload the printers and if they don't it'll only take a few minutes to teach them.”

“Excellent,” said Kerr. “I'm pleased you're both being proactive. I have a question. It seems that the EVA suits in the Base were not affected and I imagine the transports weren't either as at least two are in use.

Any thoughts on that?"

"My first reaction is that they wouldn't have been connected to the main system," said Shanice. "Off the top of my head nothing else occurs to me."

"Interesting," said Kerr. "So you think there may have been some electrical surge through the main system that caused the outage?"

"Far too early to tell," said Shanice, "but if things not connected to the main system weren't affected then it would seem a distinct possibility."

"And would the grinder be connected to the main system?" asked Kerr.

"Of course," said Shanice. "It's connected to the control and telemetry systems as well as power and communications. So are the core and the container rail. The entire production systems links back into the central system."

"Ahh," said Kerr. "That's interesting. It seems that moments before the outage the grinder reported it had come loose. Is it possible that whatever caused that separation could have generated a surge that fed back through the various systems to the central Base system?"

"It's possible," conceded Shanice. "They're connected but it's far too early to go jumping to conclusions. It's equally possible that something occurred within the Base systems that fed out to the bore and caused the grinder to disconnect. We've no way of telling at this stage and to be honest I'm struggling to imagine either of those scenarios occurring."

"Well, I dare say we'll know more in time," said Kerr. "Have you found anything anomalous in the seismology analyses yet?"

"I haven't looked yet," admitted Shanice. "I prioritised checking the printers were fully operative."

"And you were right to do so," said Kerr. "The first priority is restoring the systems. Good. Carry on."

“I have that analysis you asked for,” said Arlo as Kerr broke the connection to Engineering.

“The positions of the shuttles?” asked Kerr.

“Yes,” said Arlo. “Do you want the coordinates or their positions relative to the mine?”

“Relative to the mine,” said Kerr, leaning back in his chair.

“Shuttle 14 was preparing for landing,” said Arlo. “It was almost directly over the new bore that's being dug at the moment it shifted off course. It was at an altitude of 2261 metres above the bore and 0.314 degrees south then over a period of 1.77 seconds it gained 499 metres in altitude and shifted 203 metres further to the south.”

“It was over the bore you say?” asked Kerr, jerking forward.

“Yes,” said Arlo. “Interesting isn't it.”

“And the other one?” asked Kerr.

“Shuttle 33 had only just taken off,” said Arlo. “It rose vertically to an altitude of 4 kilometres to avoid any possible interference with shuttle 14 which was coming in to land. Just before it shifted course it was also almost directly over the bore. It was at an altitude of 7644 metres above the bore and 0.58 degrees to the north. Over a period of 0.9 seconds it gained 186 metres in altitude and shifted 84 metres further north.”

“Now that is very interesting,” said Kerr. “Both were directly over the bore at the moment they shifted position?”

“Yes,” said Arlo.

“And neither shifted position under control from either you or Zara?” asked Kerr.

“That's right,” said Arlo. “It wasn't weather related either. The wind-speed for shuttle 14 was approximately 60 kilometres per hour on a

heading of north east and for shuttle 33 it was 88kph on a heading of west south west although the atmosphere's so thin that high up it wouldn't have had any effect. They were in different currents incidentally."

"Why was one taking off and one landing so close together?" asked Kerr. "Isn't that dangerous?"

"There's a major storm to the east," said Arlo. "I was taking 33 to the west to gain height before turning it back east to go over the storm. Ordinarily all launches and landings head east although storms are common and need frequent direction changes."

"Were there any other shuttles directly over the bore at that time?" asked Kerr.

"No," said Arlo. "The mine's about twelve degrees north and the orbiter's over the equator. The others were further to the south."

"So let me get this straight," said Kerr, frowning and resting his elbows on his knees. "Two shuttles were more or less directly over the bore when the grinder came loose and the Base shut down. At the same moment the two shuttles were moved upwards and away from their positions over the bore. Is that correct?"

"Yes," said Arlo, grinning. "Like I said. Interesting."

"So why did they change position?" asked Kerr.

"I have no idea," said Arlo, "but if I was a gambling man I'd lay money on something happening in the bore that blew the shuttles off course, knocked off the grinder and shorted out the systems."

"It certainly looks that way," said Kerr. "Umm, any idea what?"

"Fraid not," said Arlo. "The shuttles only have basic sensors for positioning and so on. I'd say it wasn't a gust of wind coming up from the bore as there was no rotation or spin of either shuttle which you'd expect from turbulence. The same goes for water or something like that. Rock from an explosion or a shock wave, come to that, would

also have caused some damage but there hasn't been any. Well, nothing significant anyway. Something might show up on a visual inspection but certainly no damage that impacted flight.”

“That's a point,” said Kerr. “Both shuttles were fully functioning after being repositioned.”

“I don't know that 'repositioned' is the right word,” said Arlo. “It kind of implies something deliberate, like the Hand of God or something but yes, both shuttles are operating normally.”

“And yet whatever it was took out the Base's systems,” said Kerr, puzzled.

“Which ties in with what you were talking about with Shanice,” said Zara. “The shuttles weren't directly connected to the bore or the Base.”

“Good point,” said Kerr, sitting up again. “It also suggests whatever happened happened at the bore rather than the Base.”

“Not necessarily,” said Rikki. “Something could have happened at the Base that caused the grinder to come loose and blew the shuttles off course.”

“No,” interjected Efren. “Didn't Aisley say she got the alert about the grinder just before the system failed? If it went from the system to the grinder she wouldn't have got that alert.”

“Unless whatever happened took a finite period of time,” said Zara. “The system could have done something to the grinder and relayed the alert while it was in the process of failing.”

“It could have been magnetic,” said Rikki. “Maybe there was some sort of short circuit in the maglev track of the container rail that sent a huge magnetic pulse in both directions which caused the grinder to jump off the core and sent a blast of electromagnetic radiation into space one way and took out the systems the other way.”

“Then how would the signal about the grinder have got back to the

central system before it failed?” asked Arlo. “It wouldn't have had time to raise an alert.”

“Maybe the pulse reflected off the grinder or the core and bounced back to the central system,” said Rikki, unwilling to let her theory go that easily. “The bounce back could have amplified the original pulse going to the system and made it strong enough to jump across the relays and circuit breakers.”

“Enough, people!” said Kerr loudly, raising his hands. “This is all speculation. At this stage we know virtually nothing and what little we do know may well be wrong or misleading. Arlo, a question. Is it likely that whatever changed the position of the shuttles was a pulse of some sort or is it possible that some sort of stream was initiated and is still continuing?”

“Ahh, good question,” said Arlo. His shoulders slumped as he thought about it. “I'd say it was a single pulse that moved the shuttles. If it had been a continuous stream I would think they'd both have kept moving under the influence of the stream but, on the other hand, both shuttles were moving forward at quite high velocities so that may have taken them outside the stream while they were being shifted so maybe it was a stream.”

“Or is a stream,” said Kerr. “Perhaps it's still flowing, whatever it is. Is there any way of finding out?”

“Umm, ... ” said Arlo, looking around at the others.

“Maybe, in time, whatever it is will dissipate through the atmosphere,” said Efren. “We could pick it up then through atmospheric analysis.”

“Or we could send a shuttle down and see what happens,” said Zara. “The orbiter's too far away to see anything visually although maybe ...” and she turned back to her console.

“Maybe?” asked Kerr.

“Oh, sorry, Kerr,” said Zara. “I'm just looking to see if there's anything on the infra-red sensors.”

“And is there?” he asked.

“Just a sec,” said Zara, flipping through displays then zooming in on one. “Umm, no.”

“Shame,” said Kerr then pursed his lips. “Actually, no it isn't a shame. It's good. The last thing we want is a continuous stream of something hot pouring out of the bore. That would mean we've accidentally re-opened a volcano or something.”

“There aren't any volcanoes in the mine area, are there?” asked Rikki. “I thought the site was chosen because there aren't any volcanoes.”

“Actually Kataline told me the area to the west was a volcanic region,” said Kerr, “or maybe to the east. I don't remember. Either way she definitely said the mine's on the edge, not near the middle so hopefully volcanoes aren't an issue here.” He leant over and tapped the screen beside his chair. “Hello? Ah, Tariq, yes.”

“Shanice said you want me to go to the mine to help repair the systems,” said Tariq.

“Yes,” said Kerr. “An additional engineer will speed things up.”

“Absolutely,” said Tariq. “When do you want me to go?”

“As soon as possible,” said Kerr.

“Give me half an hour to organise some tools, spare batteries and supplies and load the EVA pod,” said Tariq.

“A moment,” said Kerr. “Arlo, Zara, can we organise a shuttle to take Tariq down to the surface?”

“We can,” said Arlo, “but the landing pad is still occupied.”

“Ahh, yes, I'd forgotten that,” said Kerr. He started to bang his fist in the arm of the chair but controlled himself and laid his hand flat quietly instead. “Damn!”

“Isn't the launch pad clear?” asked Rikki, going over to look at Zara's console.

“There's a shuttle ready for launch on the pad,” said Zara. “It's the one we're going to use to evacuate them.”

“Oh yes,” said Rikki. “Sorry, I thought it had already left.”

“So we've the same problem we had with sending someone down with the evacuation message,” said Kerr. He sighed. “Unsurprising really since we haven't actually done anything. Tariq. Hold off on going down. We're having difficulty landing you.”

“I'm willing to take the risk,” said Tariq.

“I'm not,” said Kerr. “It's one thing to take the risk carrying a life saving message but it's not worth the risk for some printer resin and someone to speed up repairs. If the shuttle crashes we loose you and the resin. We'll just have to wait until Kataline's repaired enough to get the landing pad cleared.”

“Why not bring the loaded shuttle up now?” asked Tariq. “That way I can be landed on the launch pad.”

“And we'd loose any chance of evacuating,” said Kerr. “It's still too soon to discount the need for that.”

“True,” said Tariq. “An unfortunate situation.”

“Very unfortunate,” said Kerr, “but that's the way it is.”

“I have a signal,” said Zara. “Putting it on main.”

“Ahh,” said Kerr. “Hello Arisha! What news?”

“It's Kataline,” said Kataline tersely. “We're not as fucked as I thought we were but I'm still quitting when all this is over. Has Tariq left yet?”

“No, not yet,” said Kerr. “We can't land a shuttle as the landing pad's blocked and there's a shuttle ready for launch on the launch pad

which I'm holding there in case of evacuation.”

“Why can't you clear the landing pad?” asked Kataline.

“There's a shuttle with an empty container blocking it,” said Kerr. “We can't move the shuttle from up here and your systems are down.”

“We can do that from a transport,” said Kataline. “I'll send someone with a note book. Arisha, is Gerhard still at the reactor?” Presumably Arisha replied but it was too faint to hear over the EVA suit's radio. “Good. You there Kerr?”

“I'm here,” said Kerr.

“Send Tariq down,” said Kataline. “We'll have the landing pad cleared by the time he gets here.”

“Will do,” said Kerr. “What is the system status now you've had an opportunity to investigate?”

“It's looking like only 60 to 70% of the circuits are blown,” said Kataline. “Fortunately the main power line's intact but I'm not replacing the primary relay and junction until I know the reactor's safe. Gerhard's about five minutes away and he'll need, ohh, ten minutes to decide about the reactor so I'll wait until then. Assuming it is and it probably is as we've still receiving power, I'll set up a low power bypass and get some lights working which will make things easier. I'll set up a radio link as well so you can chat with Arisha.”

“That's good news,” said Kerr. “Is there anything else we can do to assist you?”

“Nope,” said Kataline. “Not a bloody thing. Thanks for caring though. Hey, when you thought the landing pad was blocked, how were you going to tell us how to evacuate? We had no comms.”

“Arlo was going to try to land a shuttle beside the landing pad,” said Kerr. “Tariq was going to go down to you with the message.”

“Might have worked,” said Kataline. “Risky though and a long walk to

the Base if it had worked. Tell Tariq we'll be extra nice to him when he gets here. I didn't think he was the hero type.”

Chapter Twenty One

“Jesus,” muttered Kerr as the screen of the note book on his lap started to blur yet again.

Rikki glanced up from the book she was reading.

“What was that?” she asked.

“Oh nothing,” said Kerr, sitting up and trying to will his brain back to alertness. He was reading, or trying to at least, a technical overview of the Mine Base’s operating systems so that he would have some familiarity with them but struggling hard to stay awake. Beyond an ever growing disbelief that Kataline and the engineers could comprehend the staggering complexity of the systems and a depressing awareness of his own limitations he was learning very little. “This manual’s just very tedious.”

“Would you like one of my thrillers to read instead?” she asked, holding out her note book, “or a romance?” She had several hundred novels stored on it and wasn’t bored. The novel she was reading had reached a rather thrilling bit where the heroine, with the unlikely name of Sapphire Amulet, was being stalked by a werewolf through the back streets of Rio de Janeiro at two in the morning. It didn’t bode well since, as everyone knew, werewolves were at their most deadly after midnight.

“Oh, no, thanks,” said Kerr, getting up to walk around. He did two circuits of the Control Room then leant on the back of Efren’s chair. Efren was either in his own quarters or the Rec Room as there was nothing to do in the Control Room other than periodically check none of the shuttles or containers in orbit were drifting out of orbit. It had seemed pointless to insist both Rikki and Efren stayed on duty so they were now taking turns.

“When’s the next freighter due?” he asked, watching a series of numbers flow across one of Efren’s screens.

“Not for another six hours,” said Rikki, leaning over to check one of her screens. “It’s currently a little over nine million kilometres away.”

"I see," said Kerr. He resolutely turned and walked back to his chair, determined to at least read another page even if he couldn't fully comprehend it. Rikki looked back at her screen, wondering how Sapphire was going to escape as the werewolf was getting closer and Sapphire still wasn't aware of it. She'd manage somehow, Rikki was sure. Sapphire always did.

"Incoming message, Kerr," said the computer, its androgynous voice managing to sound bored as well.

"Display," said Kerr, pleased to be interrupted. He read the message and sighed.

Rikki looked up but didn't say anything.

"Computer reply," said Kerr. "Message begins. As I explained in yesterday's daily production report the drop in production from 102,000 tonnes to 11,400 tonnes was due to a significant mechanical failure at the bore and related systems failures in the Mine Base. Production has therefore been temporarily suspended and repairs are ongoing. To facilitate returning the mine to full production I have seconded one of the orbiter engineers, Tariq Shandie, to the Mine Base for the duration. I anticipate that the Base will be fully operative in another twenty four hours and, once active, repairs to the bore equipment can then begin. Until the full extent of the bore equipment damage can be ascertained I am reluctant to give an estimate of how long those repairs will take but I am confident that the mine can be restored to full production within three to five days. A full report will follow once the cause of the failures has been determined and the full extent of the damage is known. Marcus Kerr, Manager, Mars Mining Operation. Message ends."

"Three days?" asked Rikki. "You think we'll be up and running that quickly?"

"Very likely not," said Kerr, "but it's Head Office politics. If I tell them it'll take ten days up front then there'll be all sorts of ruckus. If they think production will be back in three days they'll stay quiet for the time being and I can ease them gently into a longer time frame."

“Oh,” said Rikki and thought about it for a few moments. “Hugh always said it’s best to over estimate the time for repairs and then come in quicker so we looked more efficient.”

Kerr laughed.

“Yes, I do the same,” he said, “but that only works for repairs that can be done quickly and you have a good idea of what the problem is. We don’t. Aside from the Base systems we have no idea of the extent of the problems at the bore. It’s even possible we’ll have to send to Earth for a replacement bore drill. As manager here my primary role is to manage Head Office, not the mine which can run quite happily with you guys on your own. Computer, read the message back.” He listened, thought for a few moments then instructed the computer to send the message.

“You seem quite cynical,” said Rikki.

“Not at all,” said Kerr. “I’m just experienced. The function of Head Office staff is to run the company. The function of the staff here is to run the mine. Those two functions are not directly compatible so my function is to liaise and coordinate between the two.”

“Incoming message, Kerr,” said the computer.

“Well it can’t be a reply,” said Kerr, surprised. “My message won’t have arrived yet. What time is it in London?”

“Umm,” said Rikki, leaning over to play with her displays, “09:17. It’s Thursday by the way.”

“Right,” said Kerr. “So the bureaucrats have arrived at work and are drinking their morning coffees and looking for things to interfere with. News of yesterday’s production report must be spreading.” Rikki sniggered. “Computer, display message.”

“What?” exclaimed Kerr, reading the message. He read it through again, more slowly. “Um, OK.”

“What is it?” asked Rikki, knowing it wasn’t any of her business but

sensing Kerr was in a chatty mood. Sapphire could wait.

"It's from the company's Senior Scientific Officer," said Kerr. "A woman by the name of Amber Pilchard. Have you heard of her?"

"No, but she sounds a bit fishy to me," said Rikki, keeping a straight face.

"What do you mean, fishy?" asked Kerr, staring at her. "You think this is fraudulent?"

"Must be," said Rikki. "Who'd have a name like Pilchard?"

"Hmm," said Kerr, frowning. "Computer, display the personnel records for Amber Pilchard."

"I was joking," said Rikki, belatedly remembering Kerr didn't have a sense of humour.

"She seems to be genuine," said Kerr, glancing through the personnel record, or at least that part he had the authority to access. "What do you mean, joking?"

"Pilchard," said Rikki. "You know, the fish?"

"Computer, clear personnel record," said Kerr coldly while fixing Rikki with a look. She quickly went back to her book. "Display Pilchard message."

He re-read the message again.

"Do you know what Xi waves are, Rikki?" he asked.

"Sorry, no," said Rikki, looking up again.

"Hmm," said Kerr. "Computer, connect to Engineering. Hello, Shanice. Do you know what Xi waves are?"

"Hmm?" asked Shanice, lifting her welding mask so she could see her screen. "Xi waves? They're electromagnetic waves produced by Xi

particles.”

“And what are Xi particles?” asked Kerr.

“They're heavy protons,” said Shanice.

“And what is a heavy proton?” asked Kerr.

“It's a proton with extra mass,” said Shanice.

“Which is no help at all,” said Kerr with a small sigh. “Assume I'm not an engineer.”

“OK,” said Shanice, putting her arc welding tool down on its rack. “Umm, you know what a proton is?”

“A sub-atomic particle?” hazarded Kerr.

“That's right,” said Shanice. “Atoms are made up of protons and neutrons in the nucleus and are surrounded by electrons. Protons are positively charged, electrons negatively and neutrons don't have a charge.”

“Sounds familiar,” said Kerr. “So the protons in an atom are normal weight or heavy?”

“They're normal,” said Shanice. “Here's the thing though. Protons, neutrons and electrons are made up of quarks. Have you heard of those?”

“I might have,” said Kerr cautiously. “So quarks are sub-sub-atomic particles, yes?”

“More or less,” said Shanice. “Anyway, they come in six flavours. Up, down, top, bottom, strange and charm. Protons are ...”

“What do you mean, flavours?” asked Kerr. “You can taste them?”

“God no, they're far too small,” said Shanice. “Besides, what you taste are the molecules of whatever it is in your mouth which are made up

of atoms which are made up of quarks. You can't taste anything below the molecular level. Flavours are just what physicists call the different varieties of quarks.”

“I see,” said Kerr. “Why flavours?”

“I have no idea,” said Shanice. “I'm an engineer not a physicist.”

“I see,” said Kerr, frowning. “So, correct me if I'm wrong but the six varieties of quark are called up, down and whatever the others were?”

“Top, bottom, charm and strange,” said Shanice, holding up a heavily gloved hand, “and don't ask me why. They're just names as far as I'm concerned.”

“OK,” said Kerr. “Heavy protons?”

“Yes,” said Shanice. “Ordinary protons have two up quarks and one down quark. Heavy protons on the other hand are made from two charm quarks and one down quark.”

“So a heavy proton is an ordinary proton with the two up quarks replaced with charm quarks?” asked Kerr.

“Exactly,” said Shanice. “Why are you asking?”

“Other than that what's the difference?” asked Kerr.

“Between what and what?” asked Shanice, frowning. “Up and charm?”

“Ordinary and heavy protons,” said Kerr.

“Ohh, no idea,” said Shanice. “Like I said I'm not a physicist. All matter is made up from ordinary protons which is good enough for me.”

“So where do we find heavy protons?” asked Kerr.

“As far as I know we don't,” said Shanice.

“You mean they don't exist?” said Kerr, frowning even more.

“Oh they exist,” said Shanice. “They were discovered back in the 2020s I think but they only exist in particle accelerators and even then only for a millionth of a second or so. I think they're mostly theoretical.”

“Surely if they exist even for a millionth of a second they can't be just theoretical,” said Kerr.

“Well, OK,” said Shanice. “I can't weld them though,” and she waggled her welding tool. “Why are we talking about heavy protons?”

“Because you said Xi particles are heavy protons,” said Kerr. “Is that right?”

“I'm pretty sure they are,” said Shanice. “I did a year of quantum physics before chucking it and moving over to engineering but it was a while ago. I couldn't get my head around quantum physics. It's totally weird. Like there's one quark which needs to rotate 720 degrees to get back to where it started. The rest of us only need to turn through 360 degrees.”

“I'm sure that's fascinating,” said Kerr, “but if we can get back to Xi particles?”

“What else do you want to know?” asked Shanice.

“What else can you tell me?” countered Kerr.

“Nothing much,” said Shanice, “except Xi particles probably behave differently to ordinary protons because of the charms. If a proton had two down and one up quark it would probably behave much like a normal proton with two up and one down.” She hesitated. “I think. Maybe not.”

“Why would a heavy proton behave differently to a normal proton?” asked Kerr.

“You're asking the wrong person,” said Shanice. “All I know is that the

different quarks will have something to do with the strong nuclear force.”

“The what?” asked Kerr, wishing he'd never mentioned Xi particles.

“The strong nuclear force,” said Shanice. “It's one of the four fundamental forces and it's the one that holds the guts of an atom together. Without it there wouldn't be any matter as nothing would stick together.”

“I see,” said Kerr, completely lost. “Thank you for that information.”

“So why are you asking?” asked Shanice.

“I've had a message from the Senior Scientific Officer,” said Kerr. “She mentioned Xi particles and I was just wondering what they were.”

“OK,” said Shanice. “Well, I hope I helped. Perhaps you should talk to the Senior Scientific Officer. She'd probably know more about it than me.”

“You were of great help,” said Kerr. “Thank you.”

“Well, that was a waste of time,” muttered Kerr after he'd broken the connection.

“Are you going to talk to the Pilchard?” asked Rikki. “That sounded fascinating.”

“Absolutely not,” said Kerr. “Shanice was bad enough. And don't refer to her as 'the Pilchard'. Her name is Pilchard. Amber Pilchard. Are communications with the Base still working?”

“You seriously think I wouldn't have told you if they'd failed again?” asked Rikki.

“I daresay,” said Kerr. “Connect me to Kataline, please.”

“Will do,” said Rikki, putting her book down.

“Hello Kataline,” said Kerr when the connection was established and Kataline found. “What is the situation?”

“Well, communications are still working, as you can tell,” said Kataline, “as are the environmental systems. We’ve almost finished working on the main control system here in the Control Room but we won’t be able to test it until the computer’s been repaired and the backup restored which’ll be a good twelve hours yet. At the moment Aisley and Sasha are having to control everything manually.”

“So progress is going well?” asked Kerr. In the background he could see someone’s backside sticking out from the innards of one of the consoles. From the size he guessed it was probably Mindy’s backside as she was the smallest of the engineers.

“Reasonably,” said Kataline. She looked exhausted and her blonde hair was tied back in a pony tail with a dirty piece of rag. “Be a while yet. Umm, there was something I was going to tell you but I’ve forgotten what it is.”

“When did you last sleep?” asked Kerr.

“Sleep is for wimps,” said Kataline.

“I’m sending her to bed in ten minutes,” said Arisha, appearing on one side of the screen. “That was the deal once the environment system was restarted. Eighteen hours maximum then sleep.”

“Phooey,” snorted Kataline, rubbing her eyes. “You can’t make me.”

“You will do as Arisha tells you,” said Kerr sternly. “Is that clear?”

“Whatever,” said Kataline as Arisha waved an injector behind her head and smiled at Kerr. “Why are you interrupting me?”

Kerr nodded to Arisha to show he understood she had the situation under control.

“I’ve had a message from the Senior Scientific Officer at Head Office,” said Kerr.

“Deep joy,” said Kataline. “What is that to do with me? They want to run some tests?”

“I dare say in time they will,” said Kerr, “but it seems the Parkes Observatory in Australia has been in touch with Vanofov.”

“Why?” asked Kataline. “What's it to do with them?”

“Their radio telescope picked up a burst of Xi waves some forty hours ago,” said Kerr. “It seems the burst only lasted some 17 milliseconds so they weren't able to do a full analysis but they were able to track back and locate the general area of the source.”

“Probably deep space,” said Kataline. “Why are you telling me?”

“You know what Xi waves are?” asked Kerr, curious of her reaction.

“Not really,” said Kataline, “although I'm pretty sure they're produced by Xi particles.”

“Indeed,” said Kerr. “Parkes is certain that the pulse emanated from an area of approximately 0.75 seconds of arc. As that arc is centred fairly well on Mars and the eastern hemisphere of Mars was facing the Earth at the time of the pulse Parkes contacted Amber Pilchard to see if she had any ideas of the cause. As we are the only operation in the eastern hemisphere she has contacted me.”

“Well I haven't got a clue,” said Kataline, scowling. “Why are you bothering me with this garbage? We've still got a hell of a lot of work to do here.”

“I see you are missing the point,” said Kerr gently. “Perhaps it would be better if we talk about this after you've had some sleep.”

“Yeah, whatever,” said Kataline, waving her hand dismissively. “Talk to you later then.”

She stalked away and Kerr noticed a small stagger in her walk.

“She really needs to sleep,” he said, lowering his voice.

"I'm onto it," said Arisha, moving closer to the screen. She waved her injector. "Just a mild relaxant so she can stop driving herself enough to lie down. She'll sleep then. If not, I'll give her a sedative."

"Good," said Kerr. "I'm glad you're down there. How're Tariq and the others?"

"They're doing a mighty job," said Arisha. "I couldn't wish for a better team."

"Yeah, thanks!" called Rikki.

"You're not in my team, Rikki," called back Arisha.

"I don't think Arisha was being critical of you or any of the orbiter staff," said Kerr, frowning.

"I know," said Rikki. "I apologise for interrupting your private call."

"It's not a private call," said Kerr. "If it was I'd have made it from my quarters."

"I think Rikki was trying to relieve the situation with some humour," said Arisha.

"Oh," said Kerr. He hesitated then dismissed the last few moments. "Have you any idea what it was that Kataline was going to tell me?"

"Yes," said Arisha. "She sent a probe into the bore once we'd got that part of the system working again. Partly as a test of the system and partly to get a preliminary on the extent of the damage to the grinder and the bore."

"And how extensive is it?" asked Kerr.

"It's difficult to say," said Arisha, "as the probe crashed into the side of the bore due to a fault in one of the guidance control boards, but the central core looks to be fairly undamaged other than where the grinder connected to it. That section looks to be quite heavily chewed up but Gerhard thinks it can be repaired. Kataline thinks so too."

“That's good news,” said Kerr. “What about the grinder itself? Is that badly damaged?”

“It's difficult to say,” said Arisha. “The grinder seems to be missing.”

Chapter Twenty Two

“How can the grinder possibly be missing?” demanded Kerr as Rikki’s head jerked up from her novel to listen. “It’s huge!”

“I’m sure it isn’t,” said Arisha. “Kataline doesn’t think so either. The only lighting down there was from the probe so the grinder was probably lost in the shadows or something. Anyway it would have been covered in grit and dust and probably looks exactly like the bottom of the bore. Kataline’s going to send someone down for a first hand inspection when there’s time.”

“Good,” said Kerr. “When do you think you’ll be coming back to the orbiter?”

“I had intended only to stay for a shift or so,” said Arisha, “but I think it’s best I stay until this crisis is over. Obviously I can’t help with the repairs but I can help with psychological support and making sure people take meal and rest breaks and so on. I don’t know if this applies to all engineers but certainly our engineers have an obsessive mind set and can’t seem to let go when something isn’t working and Kataline’s the worst of them. They seem to take faulty equipment personally. OK I admit that’s a good thing when something like the environmental control system wasn’t working since our lives depended on it but it is working now. Everything else is simply restoring production and I have to keep reminding them that it really doesn’t matter if it takes an extra twenty four hours or more to restart. It’s only money, after all, and it isn’t even their money. It’s just dividends to anonymous shareholders.”

“I was thinking along much the same lines,” said Kerr, “about you staying down there for the time being. It’s probably best though if you don’t let Head Office know your views. I suspect they won’t be that appreciative.”

“Perhaps,” said Arisha, “although every company knows it ultimately depends on its human resources. At least if they want to stay in business they do.”

“That would be an interesting discussion,” said Kerr, eyeing Rikki.

“But one best left to when you're back in the orbiter. Are you free to talk?”

“What do you mean?” asked Arisha.

“Is there anyone else in the Control Room?” asked Kerr.

“Aisley is here,” said Arisha, glancing behind her. “And Mindy.”

“I see,” said Kerr. “Is there somewhere you can go that is more private?”

“I'm sharing Aisley's quarters,” said Arisha. “Why?”

“I suggest you attend to Kataline,” said Kerr. “She clearly needs to sleep. When that's done please call me back from Aisley's quarters. There's something I'd like to discuss with you.”

“Intriguing,” said Arisha. “OK. Give me five minutes.”

“Thank you,” said Kerr.

He broke the connection then told Rikki he'd be in his quarters.

Nine minutes later the computer alerted him to an incoming meeting request.

“Accept on a two-way secure channel,” said Kerr and waited for the computer's acknowledgement.

“What did you want to discuss in private?” asked Arisha, suddenly appearing on the screen. A small padlock icon in the top left corner indicated the connection was secure.

“Is Kataline asleep?” asked Kerr.

“Yes,” said Arisha. “I had to give her the sedative as well as the relaxant wasn't enough. That woman has a phenomenally strong will.”

“I daresay that's why she was appointed mine supervisor,” said Kerr.

“It wouldn't be a job for the faint hearted.”

“No, I imagine not,” said Arisha. “You have concerns about Kataline? Is that why we're on a secure link?”

“Actually no,” said Kerr. “At least not directly. I, ah, now know why Hugh Lamont killed himself.”

“Ahh,” said Arisha after several seconds. “Why?”

“Shortly after you left for the mine,” said Kerr, feeling somewhat uncomfortable about discussing Hugh's personal issues, “I managed to gain access to his personal note book. What do you know of paranoia?”

“It's a relatively common mental condition,” said Arisha, “although extreme paranoia isn't that common. It's also treatable. You think Hugh was paranoid?”

“Well, the note book contained only one file,” said Kerr. “What's interesting is that he not only secured the note book against access from other people but also from the main computer. He even went so far as to disable voice recording and had to manually type everything in. I presume that was so the main computer didn't overhear what he was saying to the note book.”

“Interesting,” said Arisha, thinking about it. “So he thought the computer would, what, inform on him or something?”

“Well, perhaps,” said Kerr. “Certainly, as you know, the computer passively logs all talk as well as actions as a record of activity.”

“Yes, but as far as I am aware it should not be analysing the content,” said Arisha. “Those records are only for reference in the event of some problem.”

“Indeed,” said Kerr, “which makes me wonder if Hugh knew even back then that he'd end up killing himself which is why he took steps to ensure the main computer would have no record of him maintaining a journal. I suspect not, however. There's nothing in the

early entries that suggest that which is why I wonder if he was simply paranoid.”

“Now I’m intrigued,” said Arisha, leaning closer to her screen. “What was in his journal?”

“He wrote down his dreams,” said Kerr. “If you feel it’s appropriate you can read them when you return but in essence when he started to record his dreams they were bad and they only got worse.”

“I see,” said Arisha slowly. “Bad in what way?”

“Frightening,” said Kerr. “He writes, towards the end, that he’d wake up terrified and have to spend ten or fifteen minutes calming down before he could leave his quarters. On several occasions he says he’d wet the bed in fear although he doesn’t say if that was with urine or sweat.”

“Oh the poor man,” exclaimed Arisha. “That’s terrible! Why didn’t he come and talk to me about his dreams?”

“I suspect he saw it as a weakness,” said Kerr. “Although I rather think he did try to talk to you about it.”

“What do you mean?” asked Arisha, frowning.

“He mentioned several dreams in which his hair and teeth fell out,” said Kerr. “I remember you saying he came to see you about hair loss.”

“Indeed,” said Arisha. She put her hand to her forehead and closed her eyes. “Oh dear. I should have realised there was more to it than just hair loss.”

“You are not to blame,” said Kerr quickly. “If Hugh chose not to expand on his concerns then that was his choice. You cannot be blamed.”

“Perhaps,” said Arisha. “It’s just that ...” and she petered out.

“Just what?” asked Kerr.

“Oh nothing,” said Arisha, waving her hand dismissively. “Does he say why he killed himself?”

“Not directly,” said Kerr. “There’s no suicide note. But it’s apparent from reading his journal that his dreams, certainly in the last two or three weeks went beyond simple fear.”

“What do you mean?” asked Arisha, frowning again.

“I can only describe the feelings he wrote as being more terror than fear,” said Kerr quietly. “I’d go further in fact and describe them as existential terror. Not only were there things in his dreams that frightened him immensely but he was also starting to question, oh I don’t know, his very existence, what point there was to his life, how his life lacked any meaning. It seems he had reached the point where his life was, at least in his view, completely empty and meaningless. Although he had his career and his relationships with both the people he worked with and those close to him back on Earth his dreams forced him into feeling that he was hollow inside. He was just, as he puts it in the journal, ‘a metaphor, a cipher, devoid of substance or meaning’.”

Arisha closed her eyes and slowly shook her head. “That’s terrible, just terrible,” she muttered and wiped her eye with the cuff of her sleeve. “The poor, poor man.”

“Yes,” said Kerr. “Umm, his very last entry was ‘Is this actually my life?’. He wrote it barely twenty minutes before going to the EVA Base and opening the airlock.”

“It doesn’t bear thinking about,” said Arisha sadly. “I was only next door in the Control Room. He could easily have come to see me. We could have talked about it. He didn’t need to go and ... do that.”

“I suspect he was too far gone by that point,” said Kerr, brusquely. “The logical time to talk to you was when he started his journal, or perhaps soon afterwards.”

“Logic doesn't come into it,” said Arisha quietly, staring blankly at the screen. “The mind doesn't work like that.”

“I know,” said Kerr, matching her quietness. “I know.”

Arisha exhaled slowly then straightened up.

“I suppose there'll have to be an enquiry?” she said.

“Perhaps,” said Kerr. “Although I see no reason to hold an enquiry into his death. It was clearly suicide. What is there to enquire about in that regard?”

“Negligence on my part,” said Arisha, holding herself stiffly. “I am the medic here and I should have been more attentive to his needs.”

“Don't be absurd,” said Kerr forcefully. “Dismiss all such thoughts from you mind. That is an order. Am I clear?”

“Yes, Kerr,” said Arisha, “but ...”

“Enough!” exclaimed Kerr, holding up his hand. “Had Hugh's journal intimated you or someone else had been bullying or victimising him and as a result he killed himself I would pass the journal on to Head Office for disciplinary action but there is no question of that here. He was clearly having bad dreams and suffering depression as a result. The matter is closed.”

“Oh,” said Arisha. She gazed at Kerr for a few moments then gave herself a little shake. “You said 'perhaps' there'd be an enquiry. What did you mean?”

“Ahh,” said Kerr. “And now we come to the crux of the matter, which is why I wanted a private conversation with you.”

Arisha just stared at him.

“I'm sorry?” she said after several seconds. “You mean this wasn't about Hugh's journal?”

“No,” said Kerr. “At least, not directly.”

“What is it about then?” she asked.

Kerr sighed and stood up then sat down again and carefully put his hands together on the desk.

“I’ve been having some of the same dreams,” he said quietly.

Arisha just stared at him, a slightly puzzled expression on her face.

“You may remember I told you about one of them,” said Kerr when it became apparent she wasn’t going to say anything.

“Yes,” she said.

“There have been others,” said Kerr, a little confused by her reticence. “A couple very similar to some of Hugh’s.”

“Oh,” she said blankly. Her face looked paler than it had.

“Now I’m confused,” said Kerr after watching her for a few moments. “I expected more ... you’re not reacting.”

“I’m sorry,” she said. “It’s just that ...”

“It’s just what?” asked Kerr.

Tears started to well up and roll down her cheeks and she wiped them away with her fingers, smearing her makeup.

“So have I,” she whispered and covered her face with her hands.

Kerr watched her sympathetically and waited for her to compose herself again.

“I apologise,” said Arisha a few moments later. “That was unforgivable of me. I’m a professional and I should have more self control.”

“That’s quite all right,” said Kerr quietly.

Arisha smiled ruefully and dabbed at her eyes with the cuffs of her sleeves.

“I’m sorry,” she said, her voice stronger. “You were saying?”

“You’ve been having bad dreams as well?” asked Kerr.

Arisha nodded, reluctant to admit that weakness.

“I rather thought so,” remarked Kerr, still watching her. “I’ve noticed that occasionally you wear makeup when taking over the duty and I wondered why. It hardly seemed likely that you were wearing it for me and if there was anyone else on the orbiter, well, that relationship would be well established by now. After reading Hugh’s journal it occurred to me that you might wear makeup when you’ve had a bad night. Is that the case?”

“Yes,” said Arisha. “My dreams ... well, mostly they aren’t too bad but sometimes ... well, yes, they’re very bad.”

“As bad as Hugh’s?” asked Kerr.

“I don’t know how bad his were,” said Arisha. “I’m not thinking of killing myself though.” She smiled weakly.

“I’d glad to hear it,” said Kerr. “Just for the record, neither am I. That is, however, why I’m thinking there should be an enquiry.”

“What do you mean?” asked Arisha, giving her eyes a last dab.

“Hugh killed himself over his dreams,” said Kerr, “and yet he starts his journal by saying that he has recently begun to have bad dreams. I, myself, only rarely have had bad dreams before I came to Mars and they were nothing like the ones I’m having now. I would venture a guess you weren’t having your dreams when you arrived here.”

“No,” said Arisha. “Although they started not long after I arrived.”

“That’s what I thought,” said Kerr. “Which leads me to think that there is something about the orbiter which perhaps may be the cause. Umm, I told Rikki I wouldn’t tell you this so will you promise that it’s off the record?”

“As you wish,” said Arisha. “Tell me what?”

“I found her sleep walking in the corridor,” said Kerr. “She was wearing only her sleeping attire and seemed quite frightened when I woke her.”

“So she’s having bad dreams as well?” asked Arisha.

“I don’t know,” said Kerr. “After she got changed she came to apologise and I directed the conversation over to Hugh. At the time I wasn’t thinking in terms of dreams but on reflection she would certainly appear to have been having if not bad dreams then certainly unusual sleep activity.”

“So you think this is all connected?” asked Arisha.

“Well, of the nine people on this orbiter,” said Kerr, “Hugh, myself, you and probably Rikki have all been having bad dreams. That’s almost 50% and quite possibly some of the others have as well.”

“No one has mentioned any to me,” said Arisha.

“Nor did Hugh,” said Kerr, “and he killed himself over them.”

“True,” said Arisha and sighed.

“And I rather suspect this may be happening down there in the Mine Base,” remarked Kerr.

“Has someone said anything?” asked Arisha quickly.

“No,” said Kerr, “umm, but your makeup is smeared.”

“I’ve been crying,” said Arisha defensively. “I’ll go and wipe it off.”

"If you wish," said Kerr, "but why were you wearing makeup in the first place? You had a bad dream last night, didn't you."

Arisha sighed again and slowly nodded her head.

"Yes," she said. "And it was the worst yet. It was terrifying."

"Do you want to tell me about it?" asked Kerr.

"No, not really," said Arisha. "I'd much rather forget it."

"As you wish," said Kerr. "I'll not try to force you."

"Let's just say that I have an idea of where Hugh was coming from," said Arisha, "although for me it's more an existential dread rather than an existential terror. I woke up desperately afraid something dreadful's going to happen."

"Well, that's understandable," said Kerr, "given what's happening down there at the moment."

"I'd agree," said Arisha, "except I had this feeling before it all happened."

"Ahh," said Kerr. "When did it start?"

"The dreams or the dread?" asked Arisha.

"The dread," said Kerr.

"Ohh, around the time you arrived," said Arisha. "Although it was more of a foreboding then. The dread as such only started a couple of days ago."

"And you don't put that down to the arrival of a new manager" asked Kerr.

"No offence," said Arisha, forcing a smile, "but you just aren't that scary. You're simply a new manager and I've had plenty of new managers before."

"I'm pleased to hear that," said Kerr, smiling as well. "I would hate to think people dreaded me."

"Well, quite," said Arisha. "So you think that there's something about the orbiter that's causing these dreams?"

"I was," said Kerr. "Perhaps the layout or the decoration or perhaps even a tiny leak from the reactor in the core. It's interesting that your dreams are worse down in the Base however. I'd have expected that if there was a contributing environmental factor that your dreams were weaker rather than stronger."

"I suppose it could be the food," said Arisha. "Processed and reconstituted food isn't ideal and they have the same food down here as we do in the orbiter."

"It's a possibility," said Kerr. "That's why I was thinking perhaps an inquiry. Possibly even bringing in the company psychologist."

"You think a few bad dreams are sufficient reason?" asked Arisha, raising an eyebrow.

"If they're reason enough to kill yourself, then definitely," said Kerr. "Take Kataline, for example. Is she just stressed because of all the equipment failures or is there more to it? Is she having bad dreams as well? Is she heading for a potential suicide herself?"

"You think that's a possibility?" asked Arisha, frowning deeply.

"When I was down at the Base myself," said Kerr, "Kataline made a number of remarks about pressure from both Hugh and Head Office about improving productivity. In fact I distinctly remember her saying that Head Office is shouting at her yet when I reviewed the Management Logs I found virtually no mention of any decline in production nor any record of Head Office making it an issue. I do wonder if this is in fact paranoia on her part."

"You mean like with Hugh?" asked Arisha, pursing her lips.

"Yes," said Kerr. "And you recall the message she gave you to pass on

to me when the systems failed? That when this is all over she's quitting?"

"I assumed that was to do with stress," said Arisha.

"And it could well be," said Kerr. "In fact, I hope that it is. Stress is fairly easy to deal with. I could request an assistant for her, for example, or a co-supervisor or even have her promoted to a less stressful position but if her mental state is being caused by dreams which are in some way being caused by the environment or whatever then I don't know how to relieve that."

"I begin to see your problem," said Arisha thoughtfully.

"And yet there is more," said Kerr. "I am beginning to wonder if these dreams which a number of us are having and, potentially, all of us, are in some way related to the low morale."

"You mean the dreams are causing the low morale?" asked Arisha.

"Or perhaps the low morale is causing the dreams," said Kerr. "Perhaps there is something here that is causing both, and perhaps for all of us. Down there as well as up here."

Chapter Twenty Three

“Well now,” said Kerr when Kataline made contact again. “You’re looking several hundred percent better. You slept well?”

“Yes,” said Kataline. “It’s amazing what thirteen hours of uninterrupted sleep can do.”

“And sweet dreams?” asked Kerr.

“What do you mean?” said Kataline sharply.

“Nothing at all,” said Kerr, pleasantly. “Only that unpleasant dreams can disturb the best of sleep.”

“I daresay,” said Kataline. “Well, I had no dreams at all. That must have been the effect of all those drugs Arisha pumped into me. She has a sadistic bent.”

“Well, you needed them,” said Kerr. “You were driving yourself too hard. Do you usually have pleasant dreams?”

“Why are you going on about dreams?” demanded Kataline, narrowing her eyes suspiciously. “Arisha was rabbiting on about them as well. What’s with this obsession with my dreams all of a sudden?”

“We’re just concerned about you, Kataline,” said Kerr smoothly. “You are the most important person in this operation after all.”

“Yeah right,” said Kataline with a snort. “You’ve told Head Office that?”

“Not yet,” said Kerr, “but my report on this incident will emphasise how you responded immediately and effectively to prevent panic when the systems failed and your tireless efforts in leading the repairs and restoration.”

“You’re up to something, aren’t you,” remarked Kataline, leaning back and eyeing him. “What fresh hell are you about to dump on me?”

Kerr laughed.

"I'm not going to dump anything on you," he said. "I'm just delighted that you are coping so well. It was a nightmare situation for a while."

"Well, yes," admitted Kataline. "It was a bit hairy until we got the heating going again although it was good to know there was an evacuation plan. You will make sure you commend Tariq in your report for volunteering to come down with the message, won't you? And whoever was going to land the shuttle off the pad. That would have been difficult with only the on-board telemetry."

"That was Efren," said Kerr.

"Thank him for me, will you," said Kataline.

"I will," said Kerr. "So what's the situation now?"

"The big news is that Gerhard, Mindy and Tariq have got the computer going and restored the operating system, software and data," said Kataline. "It's running its internal system checks as we speak and we should be able to switch back to autonomous control in the next hour or so. There's still a lot of repair work to be done but we're getting there."

"Excellent," said Kerr. "Where are the engineers now?"

"Mindy is asleep," said Kataline. "Tariq is working on the pump for our water supply. A bearing seized when an oil seal failed."

"That doesn't sound too serious," said Kerr. "And Gerhard?"

"I've sent him off to do a visual inspection at the bore," said Kataline. "When we've finished at the Base the next task will be the mine itself. Once Gerhard has a good idea of what needs to be done Shanice can start printing whatever parts are needed."

"Ahh, that may not have been a good idea," said Kerr, frowning.

"It maximises efficiency," said Kataline, also frowning. "By getting the

parts ready while we finish working on the Base we can move straight over to the bore rather than wait for the parts. It'll save time."

"Oh absolutely," said Kerr. "I fully appreciate that. It's just that there is some uncertainty over safety in and around the bore."

"You mean the missing grinder?" asked Kataline. "Don't worry. It'll be there somewhere."

"No, I meant the burst of Xi waves," said Kerr. "I told you about that yesterday."

"What burst of Xi waves?" demanded Kataline. "What are you talking about."

"This is entirely my fault," said Kerr. "I could see you weren't functioning well which was why I sent you to bed. I should have left instructions for no one to go near the bore but I didn't think of it."

"I was fully functioning," bridled Kataline. "I was just tired, that's all."

"Calm down, Kataline," said Kerr, holding up a hand. "No one is criticising you in any way. As I said, the fault was mine. Where's Gerhard now? Has he left yet?"

"He's almost certainly there now," said Kataline. "It's only a fifteen minute drive. What's the problem?"

"I don't know if there is a problem," said Kerr. "It's just that I had a message from Amber Pilchard, the Senior Scientific Officer, saying that Parkes Observatory in Australia had picked up a burst of Xi waves emanating from the eastern hemisphere of Mars at around the same time that the Mine Base systems failed and the grinder disconnected. There may be a connection."

"You think the system failure generated a burst of Xi waves?" asked Kataline. "I'd say that was pretty much impossible. You need a hadron collider for that sort of thing and for sure we don't have one here."

"Actually I was thinking it was the other way around," said Kerr. "Is it

possible that something happened in the bore that for some reason generated a burst of these Xi waves that knocked the grinder off the central core and blew out the Base's systems?"

Kataline's nostrils flared as she stared at Kerr while thinking. Then she suddenly exhaled loudly.

"I suppose it is possible," she conceded. "My first reaction would be to say no unless we happened to bore directly into a hadron collider which would be highly unlikely but this is Mars and an alien environment. I suppose there is a tiny possibility there is some natural process down there that could be generating Xi particles but I can't begin to imagine what it is."

"OK," said Kerr. "Let's just suppose for a moment that there is. Would it be dangerous?"

"Well," said Kataline slowly, "if it's capable of tossing a 140 tonne grinder around then I'd have to say yes but I don't really see how that could happen. Possibly the frying of the electrical systems but not damaging the grinder."

"Why's that?" asked Kerr.

"Xi waves are generated by Xi particles," said Kataline, "which are just protons when all's said and done. That means the waves are electromagnetic so they'd effectively be just another form of light. Now that could induce a rogue electrical current in wiring but to generate sufficient electromagnetic force to move the grinder sufficiently to break it away from the core it would have to be extreme and I don't see how anything that extreme could have remained undetected. Come to that, I don't really see how our mining would cause the release of such forces."

"I see," said Kerr. "So you don't think Gerhard is in any danger from these Xi waves?"

"Not directly," said Kataline, "unless whatever it was happens again and blasts him out of the bore like a cannon."

“What about radiation poisoning?” asked Kerr.

“Oh Xi waves aren't radioactive,” said Kataline. “As I said, they're just another form of electromagnetic waves. He might possibly get the equivalent of sunburn but his EVA suit would protect him from that. We get a lot of radiation from the sun here since there's very little atmosphere to absorb it.”

“I see,” said Kerr.

“Besides,” added Kataline, “didn't you say that Parkes picked up a burst?”

“Yes,” said Kerr.

“Which means it isn't a continuous stream,” said Kataline. “So if something did happen at the bore to cause it, and we don't know that anything did, we're just speculating, that's all. But if something did happen it happened in an instant and has stopped. They're not reporting a continuous stream and we're not experiencing further failures.”

“Well, true,” said Kerr.

“Anyway, how can they be sure that the burst came from the bore?” asked Kataline.

“They tracked back,” said Kerr. “One moment. Computer, display message from Pilchard. Ah, yes. Parkes said the burst came from somewhere within less than one second of arc, centred approximately on Mars.”

“One second of arc?” exclaimed Kataline. “Just a sec, I can't do the maths in my head. Umm, ...” She tapped busily on her note book for a moment. “Pah, that works out at roughly double the diameter of Mars. The burst could just as easily have come from somewhere beyond Mars. No way can they say it came from something as small as a twenty metre wide bore.”

“They didn't say that,” said Kerr. “I was just struck by the coincidence

of events and made an assumption. I could well be wrong but it's a very striking coincidence, isn't it."

"Perhaps," said Kataline, tapping her fingers absently on her note book screen and causing it to get very confused. "But a burst of Xi waves? That sounds more like something from deep space, not Mars."

"So what shall I tell them?" asked Kerr.

"Tell who?" asked Kataline.

"The Parkes astronomers," said Kerr. "They contacted Vanofov so see if we had any knowledge of the burst they picked up."

"Ohh," said Kataline. "Well we don't know anything about it do we. It's not like we picked up any Xi waves ourselves. We don't have the equipment for it. You could always ask the Chinese."

"What have the Chinese to do with it?" asked Kerr, mystified.

"Their operation is on the other side of Mars," said Kataline. "If the burst came from deep space then it would have hit that side. Earth would have picked up what spilled around the side of Mars."

"Ahh, I'm with you," said Kerr. "Yes, good point. I'll suggest they contact Kantan Kaifa when I reply."

"I wouldn't think they'd have noticed though," mused Kataline. "Nobody monitors for Xi waves. In fact I'm surprised Parkes do. Oh well. So, are we done here?"

"Yes, I think so," said Kerr. "You and the staff are well and repairs are progressing. You'll let me know what Gerhard uncovers?"

"Of course," said Kataline. "Don't be so paranoid."

"I wasn't being paranoid," said Kerr. "I was merely politely reminding you to keep me in the loop."

"Why wouldn't I?" asked Kataline. "It's not like you've got anything

else to do except write reports about me.”

“And on that note I think we’ll end this discussion,” said Kerr. “Until later.”

* * *

“Kataline's on the line for you, Kerr,” said Zara some time later, “except she's gone again. The connection's still open though.”

“Put it on the main screen,” said Kerr. “Where's she gone?”

“I've no idea,” said Zara. “She just opened the connection then walked away.”

“OK,” said Kerr. He was reflecting on how much leeway to give to indispensable members of staff when Kataline came back.

“Hey,” said Kataline, seeing Kerr on her view screen. “Just went to get some coffee.” She held up a mug as evidence.

“Enjoy,” said Kerr. “You have news for me?”

“Yes,” said Kataline, sitting down. “Gerhard's back from the bore. There's a fair amount of damage but it's not as bad as I feared. Most of the electrics are shot to hell as you'd expect. The grinder orbital joint is mangled beyond repair so that'll have to be replaced and there's considerable distortion to the bottom section of the central core, which can be repaired. The rubble transfer conveyor and incline belt are also repairable. Three rubble buckets are missing as well as a section of the retrieval belt and both coolant pumps are damaged but repairable. The coolant elbow joints are shattered which is only to be expected but they're easily replaced. The good news is that the central core drill bit is undamaged. The grinder differential bearings are stripped but they can be remoulded. All in all it's not too bad.”

“And Gerhard?” asked Kerr. “Is he good?”

“I wouldn't say that,” said Kataline, sipping her coffee. “He's a bloody pain as always.”

"I meant is he well?" asked Kerr. "No ill effects?"

"Sadly not," said Kataline. "I mentioned what you said to Arisha and she gave him a check over then sent him to get some sleep. She said he's fine."

"Excellent," said Kerr. "Did he find the grinder itself?"

"Well, that's the weird bit," said Kataline, leaning back and nursing her coffee on her chest. "Apparently it's fallen down a hole."

"A hole?" said Kerr, taken aback. "What do you mean, a hole?"

"I mean a hole," said Kataline. "In the rock. By the look of it the grinder passed over a section of rock that gave way causing it to fall and rip itself away from the central core. It's not designed to be self supporting and all the damage to the central core is consistent with that happening. What's weird is why there was a cavity there in the first place."

"Could it have been a bubble of trapped gas?" asked Kerr.

"Most likely that's what it was," said Kataline. "Bloody big bubble though."

"Explain," said Kerr.

"Gerhard looked inside the hole," said Kataline, "as you'd expect. He couldn't actually see the grinder as the hole was too deep for his torch but it'll be down there somewhere. Probably in pieces as it's cast iron and most likely shattered but we can weld the pieces back together if we have to. We've a spare grinder so it's not a biggie and Earth can send up another anyway."

"Do you want me to order a replacement?" asked Kerr.

"No, not yet," said Kataline. "We can use the spare for the time being and we'll send in a big order for parts when we're sorted. Coming back to the hole though, Gerhard said it looked strange."

"I see," said Kerr. "Strange in what way?"

"Well, he didn't do a full blown survey of course, since he was there to inspect the equipment," said Kataline, "but he said it looks like the bore is directly over the edge of this cavity so half of the bore base is on solid rock and the other half is perched over the cavity. It's almost like a cliff apparently since the edge is straight."

"Straight?" said Kerr, leaning forward. "What do you mean?"

"I'm not sure," said Kataline. "Gerhard only had a quick look to see if he could see the grinder but he said that as far as he could tell using only his torch the straight edge continued both sides of the bore as far as he could see with his torch light and it seems to go back a long way as well. More like a box than a bubble, he said."

"Interesting," said Kerr. "A box you say?"

"I wouldn't put too much faith in that," said Kataline. "Torches have a fairly narrow beam and can give very misleading impressions. What's more important is that there's no point in continuing to bore where there's a cavity. We'll have to extract the central core and relocate which will be a nuisance as we'll have to survey this cavity to find out its extent so we don't cut down into it again."

"How is it possible you didn't know it was there?" asked Kerr.

"I'm a little puzzled by that myself," said Kataline. "Seismology doesn't show up small pockets of gas or liquid so in itself I'm not surprised but one this big? Most likely Gerhard's made a mistake. He was tired and torches aren't the best way to explore new situations."

"So there was nothing in the seismology to suggest a big cavity?" asked Kerr.

"No," said Kataline. "Actually, if Gerhard is right it sounds more like a sub-surface trench but that would definitely show up in the seismology."

"I see," said Kerr, slowly leaning back with a puzzled expression on

his face.

“The geology isn't consistent with a sub-surface trench either,” said Kataline, taking another sip. “We cut down through about a hundred and fifty metres of relatively soft rock then encountered a layer of very dense rock for a couple of metres before losing the grinder in the hole. That makes no sense, geologically. How would a layer of dense rock form on top of an empty cavity or trench?”

“I'm not a geologist,” said Kerr. “I have no idea. So, what happens now?”

“Ohh, we'll finish sorting out the Base,” said Kataline, sitting up abruptly and nearly spilling her coffee. “Then we'll pull up the central core and repair it before moving it to another location. I'm thinking pulling it back maybe fifty metres or so so it's some way from this cavity and we can still access the palladium seam. That way we can survey the cavity to establish its extent while the new bore is being mined.”

“That makes sense,” said Kerr. “When do you think you might be able to restart production?”

“Ohh, at least 36 to 48 hours,” said Kataline. “Probably longer.”

“Well that's something,” said Kerr. “A question. Was the transition from the soft rock to the dense rock gradual or sudden?”

“I've no idea,” said Kataline. “Why?”

“Just an idle thought,” said Kerr. “Well, I won't keep you unless you have anything else to report?”

“No, that's all,” said Kataline. “Catch up with you later.”

She broke the connection and Kerr stared at the screen for a while, deep in thought.

“Zara,” he said unexpectedly, making her jump. “Where's Shanice?”

“Umm,” said Zara, switching screens to the personnel tracking display. “She’s in the Rec Room.”

“Excellent,” said Kerr. “I’ll go and see her there.”

He climbed the ladder and strode briskly along the corridor to the Rec Room. Shanice was indeed there, having a meal and chatting with Arlo.

“Hello,” said Kerr, dropping down. “Are you busy Shanice?”

“Just having some lunch,” said Shanice. “Did you want me?”

“I’ll be off then,” said Arlo. “I haven’t been to the gym yet today.”

“Thanks,” said Kerr, taking Arlo’s seat. “Have you had a chance to look at the seismological analysis of the area around the bore yet?”

“Yes and no,” said Shanice, pushing her empty plate away. “I started looking at the local area and it looked a little odd so I’ve been expanding the range.”

“Odd in what way?” asked Kerr, frowning.

“I’m not entirely sure,” said Shanice, her face twisting a little wryly. “Up to where the bore is the geological structure looks fairly normal but just after the bore is becomes, I don’t know, featureless I suppose is one way to describe it.”

“What do you mean, featureless?” asked Kerr.

“Around a hundred and fifty metres down it’s fairly smooth,” said Shanice. “Normally you get undulations in the strata but there aren’t any in a fairly large area to the west.”

“Why wasn’t this picked up before?” asked Kerr.

“Oh several reasons, I imagine,” said Shanice. “The AI analysis looks for complex formations rather than even ones for a start. That’s where problematic geology is likely to occur, not in regions of uniform

geology The main reason I suspect though is that we weren't planning to mine this area when the analysis was done. We were focusing more to the east and north, around the Mine Base. They probably only did a cursory and fairly superficial analysis of the area we're now mining."

"I see," said Kerr. "Could you show me on the map?"

Chapter Twenty Four

“I have to say Kataline's not overly impressed with you,” said Arisha as she started to drive back to the Mine Base from the landing pad.

“I confess I'm not surprised,” said Kerr. “It was, however, an impulse decision.”

“I didn't think you were the type to act on impulse,” said Arisha giving him a sideways glance which he didn't notice. “I did try to explain to Kataline that the manager coming to inspect the Base was perfectly normal after a major incident but I don't think she believed me.”

“That doesn't surprise me either,” said Kerr. “Hugh and the previous manager probably wouldn't have bothered. I am not them, however.”

“Indeed you are not,” said Arisha. “So, umm, you think the others will be all right up in the orbiter with neither you or me there? I wouldn't think Head Office will be overly impressed to find both the Manager and the Assistant Manager away from the orbiter.”

“I'm sure they will cope admirably,” said Kerr. “They are all very capable and experienced and in all honesty I'm something of a spare wheel. I have neither the background nor the training to be of much use should problems arise. All I can do is make decisions when needed and I can do that just as easily from down here as I can up there. I'm really only here to approve actions and take responsibility.”

“So why have you come down to the Base?” asked Arisha, her curiosity getting the better of her.

“Partly because I was due to make my weekly visit,” said Kerr blandly. “Consistency can be crucial to morale even in a crisis situation. Perhaps even more so. And, as you said, it's a good opportunity to inspect the Base before I prepare my interim report.”

“Hmm,” said Arisha. His reasons didn't sound overly plausible but she suspected he wasn't going to expand any further.

They drove on in silence for a while, the dull orange sandy landscape doing nothing to banish the faintly oppressive and surreal character of the desolation.

"I've talked to some of the team about their dreams," she said when she felt the silence had gone on long enough. "I kept it quite informal and chatty."

"Is it appropriate to discuss that now?" asked Kerr, turning to look at her. The pale sunlight glinted off the visor of her helmet and made it difficult to see her eyes.

"I've got the comms set to local only," said Arisha. "The Base can't hear us."

"Ahh, good," said Kerr. "So what have you uncovered?"

"Kataline, as you know, refuses point blank to discuss her dreams," said Arisha, "which makes me suspect she must be having bad ones otherwise she'd just say she doesn't dream or whatever. She got a little hostile, in fact, which suggests it's a sensitive subject for her."

"Yes, I rather got that impression myself," said Kerr. "And the others?"

"Sasha admitted he often has bad dreams but dismissed the dreams as unimportant," said Arisha. "When I asked if they affected him when he was awake he gave me a categorical 'no' and walked away. Aisley dreams quite often as well and said she found her dreams depressing. I asked her if they ever scared her and she admitted they do which is why she sleeps with a teddy bear. She finds Mortimer comforting apparently."

"Mortimer being the teddy bear?" asked Kerr.

"Yes," said Arisha. "She has several other soft toys as well. She had them sent from Earth not long after she arrived here."

"That would explain the rabbit slippers," said Kerr thoughtfully.

"What rabbit slippers?" asked Arisha, following the track markers

around a low dune. The frequent sand storms often obscured the road that had been laid.

“When I first met her she was wearing her uniform with fluffy rabbit slippers,” said Kerr. “I told her they were inappropriate so she went and changed to regulation shoes. I don't know if she still wears them but in the light of what you're telling me perhaps I should have been more ... forgiving.”

“Oh yes, those slippers,” said Arisha. “Yes, she's still wearing them. Kataline doesn't seem to mind.”

“Ah well,” said Kerr. “And the others?”

“I haven't had an opportunity to talk with Gerhard, Anders or Tariq yet,” said Arisha, “as they're very busy at the moment but Mindy was quite interesting. It seems she dreams a lot about Chinese warriors doing battle with some frightening but unknown enemy. She puts it down to her watching a lot of videos about the Warring Kingdoms period of ancient Chinese history conflated with some supernatural distortion of Mars. She says it's a period that fascinates her.”

“And what do you think?” asked Kerr.

“Well, that seemed a reasonable explanation,” said Arisha. “I haven't checked her quarters to inspect her video collection but there are several of that sort of movie in store in the Rec Room as well as a number of martial arts and supernatural horror movies. What I found interesting is that she said the enemy in her dreams is never revealed. It's always some unknown, unseen but powerful force that decimates her army and ravages the countryside leaving it a smoking ruin filled with broken and dismembered bodies. That seemed a little strange since you'd expect warring kingdoms to be similar in nature and weaponry. You know, other Chinese or Mongols or whoever the Chinese were warring with during that period and with swords or bows and arrows.”

“Interesting,” said Kerr. “So again we have at least half the personnel experiencing disturbing dreams. Why do you suppose they're unwilling to talk about them?”

“Are you referring to me and my dreams?” asked Arisha.

“No, not specifically,” said Kerr. “But Hugh certainly wouldn't talk about his and Kataline refuses point blank. Sasha, Aisley and Mindy did but only when you brought it up and by the sound of it they didn't particularly want to go into details.”

“Yes,” said Arisha. “I don't want to either. They're very personal, intimate I suppose. Besides bad dreams are a weakness, aren't they. Don't forget everyone here and in the orbiter were selected for their mental toughness and resilience and, to a large extent, their ability to be non-dependent on others for their validation and self-esteem. We're not the sort of people who go around talking about our dreams all the time and wondering what they mean. We're here to do a difficult job under stressful and unnatural conditions so bad dreams will be seen as a sign of not being able to hack it.”

“I appreciate that,” said Kerr, “but when everyone is experiencing such dreams? Wouldn't that suggest some common causal factor?”

“I dare say,” said Arisha, “but that would require us to openly communicate about things we don't want to be open about or communicate. The issue has only arisen because you found Hugh's journal and told me you had been having similar dreams. Had you not done that I would never have admitted I was having bad dreams as well nor would I have gone round talking to the others about theirs.”

“Fair point,” said Kerr. “And it's a bigger issue here than on the rigs where I'm from. Tours of duty are rarely longer than three months and more usually on a three week on two week off basis. Here the tour is two years without a break.”

“Yes,” said Arisha, “which gives issues more time to develop while at the same time requiring more mental tenacity to deny any negative effects. If Hugh had left after, say, a year he'd probably not have killed himself.”

“That's right,” said Kerr. “I think I'll put in an unofficial report to the company psychologist and see what she thinks. It would be a useful idea I think if we also give some thought into how to alleviate the

situation. It certainly seems to be the case that whatever the cause or causes they're not limited to the orbiter."

"Yes, I'd agree," said Arisha, a ball of anxiety opening up inside her, "although I think when you raise this with the psychologist you should keep things anonymous. Hugh, obviously, needn't be anonymous but I for one don't want things spread around the company about my mental state. It could have a negative impact on my career when I move on from here."

"And that is another issue," said Kerr pensively. "After all, even with no names being given there are only fourteen of us on Mars and we'd all be tarred with the same brush. We don't actually know if Gerhard and the others are having bad dreams and we can't be sure if the effects are always bad. Granted Hugh killed himself but Kataline could always have been leaning on the paranoid side. It's a common personality type, particularly among high achievers. I think I need to give a lot more thought to this before I approach the psychologist."

"Indeed," said Arisha, relieved. "Let's see what we can do ourselves first. Perhaps we can resolve it ourselves, much like your idea to redecorate the Mine Base. Then, if we're successful, we can present our recommendations more as a fait accompli on operational matters rather than as a psychological problem to be investigated."

"Yes, that sounds much better," said Kerr. "I vastly prefer solutions to problems. That's my personality type."

* * *

The Base looked to be deserted when they emerged from the lift and hung up their EVA suits. The place was well lit which Kerr was pleased to note and there were large piles of carelessly discarded electrical equipment along the front of the engineering store.

"I wonder what will happen to that lot," remarked Kerr, going over to pick up a circuit board. It looked almost pristine but doubtless the insides of the chips and other components were damaged.

"I imagine they'll be recycled," said Arisha. "We recycle most things

here although there is rather a lot. There's more inside. The engineers have replaced something like 60% of the electrical components.”

“I dislike waste,” said Kerr, tossing the circuit board back on top of the pile. It skittered down the side and ended up on the floor so he picked it up and gently placed it on the top again. It slid down a few centimetres then caught in a tangle of wiring.

He turned his back on the waste, strode into the Control Centre and looked around. Aisley was sitting at the console as he'd expected but the sides of the consoles were stacked against one wall and its complex innards were on display. A bundle of wiring and optical cables dangled from one of the conduits in the ceiling. In one corner stood a tall, free-standing lamp with a large battery beside it.

“Twenty seven,” said Aisley, looking up. She smiled when she saw Arisha then her face fell when she saw Kerr.

“Hmmm,” remarked Kerr, his eyes drawn to her fluffy rabbit slippers.

“I was just about to get changed,” she said quickly, her face going slightly pink.

“We're currently undergoing a period of high stress,” said Kerr, dismissively waving a hand. “You may continue to wear the slippers for the time being.”

“Aisley!” exclaimed a voice emanating from behind the denuded console.

“Umm, thirty one,” said Aisley, quickly looking back at the display. She glanced at Arisha as Kerr went behind the console and raised an eyebrow. Arisha gave a quick shake of her head.

“Thirty four,” said Aisley.

“Is that you Tariq?” asked Kerr. “What are you doing?”

“Oh, hello Kerr,” said Tariq, his face emerging from between racks of circuits. “I didn't know you were coming down.”

“A surprise visit,” said Kerr. “What are you doing?”

“I’ve just installed a new ganamometer,” said Tariq. “We’re calibrating it. What’s it now, Ais?”

“Thirty five,” said Aisley.

“Perfect,” said Tariq. “Right, let’s try the booster.” He delicately inserted a sonic screwdriver between two large circuits.

“I’ll leave you to it,” said Kerr. “Where’s Kataline?”

“She’s in the equipment store,” said Aisley. “No, it’s still dead.”

“Thanks,” said Kerr. He walked back out of the Control Centre and crossed over to the store. For want of anything better to do Arisha followed.

“Are you here, Kataline?” called Kerr trying to look between the seemingly endless racks of pieces of equipment. Many were large, as befits a mining company, and most were incomprehensible. A few items, such as springs, gaskets and cogs, were recognisable but mostly the bits and pieces appeared to serve no fathomable purpose. The place smelt quite strongly of lubricating oil.

There was a loud crash as something heavy and metallic was tossed back into its container then Kataline emerged from between two racks at the far end.

“Yes,” she said tersely. “Where else would I be?”

“You could be anywhere,” he said.

“Like Bali?” said Kataline, stomping towards him. “I’d rather be in Bali.”

“It’s overrated,” said Kerr. “The Bahamas are better.”

“I wish,” said Kataline. “So why’re you here?”

"I just wanted to have a look around," said Kerr.

"Balls," said Kataline. "No one would spend two and a half hours in a shuttle just to look around this dump. Why're you really here? Don't trust me, huh?"

"I do trust you," said Kerr. "You're doing a remarkable job."

"You think?" she asked, looking up at him. He was half a head taller than she was.

"Yes, I do," said Kerr.

"And you've only been here a couple of minutes," she said sarcastically. "I'm impressed you've been able to see so much so quickly."

"Ah," said Kerr, glancing at Arisha. "I'm sensing a little hostility here."

"No, really?" said Kataline. "A little hostility? I wonder why that could be."

"You tell me," said Kerr.

"Oh I don't know," said Kataline, putting her hands on her hips. "Maybe it's because the last guy never came down here and you're down here every five minutes. Maybe that's what it is. Sticking your nose in."

"This is only my second visit," said Kerr mildly.

"Seems more," said Kataline. "So why're you here? You know we're getting things back to normal. You're here to chivy us along, huh? Motivate us? Inspire us maybe? Or maybe show the tossers in Head Office what a hands-on manager you are?"

"Ahh," said Kerr. "I get the impression you resent me being here."

"Now why would I do that?" asked Kataline belligerently.

"I'm not entirely sure," said Kerr. "I suppose it'll be best if I'm honest and upfront with you."

"Bit late to be upfront," snapped Kataline. "You're here aren't you. Time to be upfront would have been before you left. Honesty's good though. What you got to be honest about?"

"I'm actually here to see the bore," said Kerr. "I want to see inside the hole you were telling me about."

"What the hell for?" demanded Kataline. "It's just a hole."

"Perhaps," said Kerr. "Perhaps not."

Kataline stared at him for a few moments then glanced at Arisha.

"Do you know what he's talking about?" she asked, jabbing her thumb at Kerr.

"Umm," said Arisha since she had no idea and didn't want to admit it.

"Is there somewhere we can talk without being interrupted?" asked Kerr.

"So I'm being sacked, am I?" asked Kataline, her shoulders sagging a little. "That's why you're down here? To do it personally?" She waggled her fingers to put quote marks around the 'personally'.

"Absolutely not," said Kerr, frowning. "As I said yesterday what you've achieved in this crisis is remarkable. I've not been instructed to dismiss you and if I was I'd fight it tooth and nail."

"Oh," said Kataline, taken by surprise. She blinked a few times then glanced at Arisha and back at Kerr. "Oh."

"Somewhere to talk?" asked Kerr again.

"The Rec Room," said Kataline. "We'll go there."

"Excellent," said Kerr. "Umm, Arisha, you might as well come too."

“Delighted,” said Arisha then wondered why she'd said that. Admittedly she was looking forward to what this discussion was going to be about as it promised to be diverting but ... delighted? She mentally shrugged and followed Kerr and Kataline to the Rec Room.

“Give us the room,” said Kataline when she saw Sasha sitting at one of the tables. He was watching a movie on a note book and eating a plate of reconstituted fried potatoes.

“Why?” he asked.

“Just move it,” snapped Kataline. “Don't argue.”

“OK, OK,” said Sasha, getting up. “I'm moving, OK.” He took the note book and plate with him.

“Close the door, would you, Arisha,” said Kerr.

“Certainly,” said Arisha. She pushed the button and the door slid silently half way then jammed.

Kataline gave the door a filthy look then hit it hard with the side of her fist. It jerked then slid the rest of the way.

“Low priority,” she said.

“Of course,” said Kerr. “Coffee?”

“I'll get some,” said Arisha.

“Thank you,” said Kerr.

He moved over and sat at one of the tables. Kataline watched him then sat opposite and leaned back with her arms folded defensively.

“Computer,” said Kerr. “Enable privacy protocols.”

“Enabled,” said the computer and the view screen on the wall went blank.

“That serious, huh?” asked Kataline.

“Perhaps,” said Kerr. “I just don't want anyone overhearing. Not yet anyway. Not until I'm certain.”

“Certain of what?” asked Kataline.

“I'm not sure,” said Kerr, putting both his hands flat on the table.

“You're not certain of what you're not sure of?” asked Kataline. “What kind of manager are you?”

“One with a wide ranging brief,” said Kerr.

Arisha turned away from the microwave to look at him. He'd mentioned a wide ranging brief before but hadn't expanded on it.

“Well?” asked Kataline.

“This hole at the bottom of the bore,” said Kerr.

“You know that reminds me of an old joke,” said Kataline, twisting slightly in her seat. “A hole has been discovered in the road. The police are looking into it.”

“Well, I'm hardly the police,” said Kerr, “but I do want to look into it.”

“Why?” asked Kataline as the microwave pinged. Arisha turned back to take the coffees out.

Kerr took a deep breath and held it for a few moments.

“Because I have a suspicion it might be an alien artefact,” he said.

Chapter Twenty Five

Kataline just stared at him for a few moments while Arisha concentrated on not dropping the coffee mugs. Then she laughed.

“There's no life on Mars,” she said. “That's well established.”

“I know,” said Kerr, “but I said artefact, not life.”

“Yeah,” said Kataline, unfolding her arms and leaning forward. “I think you'll find there's never been life on Mars. It's a dead planet.”

“I don't think that's entirely true,” said Arisha, putting the mugs on the table. “There has been speculation that the high quantities of methane in Mars may have a biological origin and the same may be true of the traces of formaldehyde.”

“Both of which can be produced by other means,” said Kataline, standing up. “Can I get back to work now?”

“Why do you think that, Kerr?” asked Arisha, motioning for Kataline to sit down again.

“Because of this hole,” said Kerr. “Computer, display seismology survey labelled Bore1 and map labelled Bore2 side by side.”

A moment later both images appeared on the view screen.

“This is where the current bore is located,” said Kerr, getting up to point at a red dot marked on the survey. “I asked Shanice to review the survey after hearing about the hole. Interestingly she noticed that the undulations in the sub-surface geology do not extend past the bore. In fact the lack of undulations continues for some considerable distance. Now, if we look at the map of the surface of the same area there is no sign of that anomaly.”

“Which is what you'd expect,” said Kataline. “The surface is subject to erosion. What's your point?”

“Gerhard said the hole appears to extend some distance,” said Kerr,

“at least as far as his torch carried and you told me that the last couple of metres before the hole appeared was unusually dense rock. You also said you couldn't quite see how that dense rock could have formed over the hole without support.”

“I still don't,” said Kataline, “but how do you go from that to aliens? It's just geology.”

“Indeed,” said Kerr. “But look at the survey results. Shanice told me that ordinarily the survey results are looked at in hundred metre squares so I asked her to link the adjoining survey squares together. Computer, display survey labelled Composite. This covers an area of five kilometres by five kilometres. Can you see this?” and he ran his finger across the image. “The area of uniformity extends over an area of about four square kilometres and appears to form a fairly precise heptagon.”

Kataline's eyes narrowed and she stepped over to take a closer look. So did Arisha and Kerr stepped back.

“Now,” said Kerr, “if we assume that this flat heptagonal area is composed of the same layer of dense rock that's covering the hole the grinder fell into we have to wonder how it is possible that this layer and the layers above it were able to form over an area of four square kilometres without anything underneath to support it and, at the same time, maintain the shape of a regular heptagon.”

“It could have been formed over a layer of liquid,” said Kataline. “At some point in the past that liquid drained away leaving the dense rock in place and, because of its density, it was able to support the layers that formed above it.”

“In a heptagon?” asked Kerr.

“Some form of crystallisation,” said Kataline, shrugging her shoulders.

“Perhaps,” said Kerr. “I'm not a geologist and, of course, we've no way of knowing if the cavity underneath extends throughout the four square kilometres. Shanice told me that the mining was expected to be outside this area so only a seismological survey was done rather

that the full blown set of magnetic, electrical resistance and multi-channel wave analyses.”

“Well, that’s true,” said Kataline, going back to the table and sitting down. “It wasn’t deemed important enough I imagine. Before my time though.”

“And there wouldn’t be any mining in this area now if you hadn’t uncovered that seam and decided to follow it,” said Kerr, going back as well.

“Granted,” said Kataline. “We’d still be mining more to the east. It could be decades before we got that far west otherwise. I still don’t see your point though. How does this translate to alien artefacts?”

“Well, it was just a thought,” said Kerr, dropping into his chair. “It occurred to me that perhaps this heptagonal area of dense rock over a large cavity might have been created deliberately. As a cap or a cover, protecting whatever was inside.”

“You mean like an underground city or something?” asked Arisha.

“Possibly,” said Kerr.

“You’re living in fantasy land,” said Kataline. “All we have is a large hole under a layer of dense rock which could have been created by tectonic forces or liquid and you’re presuming there’s a city down there. That is one hell of a leap of the imagination.”

“I agree,” said Kerr, “and my only real reason for thinking that way is its size and apparently regular shape. I’m almost certainly wrong but I wanted to look inside the hole either way.”

“So why not just say so?” asked Kataline. “Why go on about aliens?”

“Because you wanted an explanation for my visit,” said Kerr. “You didn’t seem to think that my wanting to look inside the hole was sufficient reason and you were concerned I might have some other objective that would negatively impact you.”

Kataline's jaw clenched.

"I assure you that's not the case," said Kerr, holding up a hand to forestall her. "I'm sure the hole is just a hole as you say but if there is the remotest possibility that it is some form of alien artefact then there is the possibility, however small, that that artefact is somehow the cause of the mine's ... difficulties over the last few months."

"Excuse me?" exclaimed Kataline, surprised. "How did we get onto that?"

"Well," said Kerr, "it would seem that the complete failure of the mine's systems at the moment the grinder broke through the dense rock layer and fell into the hole are unlikely to be a coincidence which suggests that there is some causal relationship. The pulse of Xi waves detected by Earth makes that even less of a coincidence. It's also entirely possible that the layer of rock was also acting as a shield and as the mining got closer to the edge of the heptagon whatever was inside was somehow causing all the electrical failures. You told me yourself that the number and frequency of failures has been increasing over the past year or so and, unless I'm in error, was it not about a year ago that you found the seam and started to follow it?"

Kataline just stared at the floor, her face screwed up in thought.

"OK," she said suddenly and jumped up. "I'm by no means convinced but it's a possibility. There's only one way to find out. We'll go and look inside the hole. You get suited up and I'll get some things from the stores. OK?"

"OK," said Kerr, getting to his feet more slowly. "You're coming with me?"

"Of course," said Kataline, pausing at the door. "If there's something down there that's been causing all this shit I want to know about it. Besides," and she grinned, "you haven't a clue how to operate the winch or get around the core without hurting yourself. The last thing I want is another dead manager."

"Well that's true enough," said Kerr as she disappeared through the

doorway.

“Can I ask you something?” asked Arisha after a few moments hesitation.

“Of course,” said Kerr. “You don’t need to ask if you can ask a question.”

“Why do you let her speak to you that way?” asked Arisha.

“Ahh,” said Kerr. “Yes. I imagine you see that as being out of character?”

“Yes,” said Arisha. “You normally jump on any insubordination.”

“Indeed,” said Kerr. “But Kataline’s is a little different. She needs to be handled with care.” He sat down again and ran a hand over his face. “I have some experience of people under great stress and also with someone who was suffering from paranoia. I’m not certain Kataline is paranoid, at least not in the usual sense, but certainly she is convinced that she lacks support. If I reprimand her that conviction will only be reinforced. I need to reassure her and build her trust in me and I can only do that by being consistent and transparent and focusing on facts. Dismissing her concerns as trivial or disciplining her unjustly will only aggravate her stress, not lessen it. Now, I grant that my idea of alien artefacts is pure speculation but it is supported by facts, none of which are in any way detrimental to Kataline. Not unreasonably she wanted to know why I wanted to inspect the hole so I told her the truth and she is sufficiently perceptive to see that I was telling the truth. Until such time as I can reduce the stress she’s under I need to be supportive, not disciplinary.”

“Well, yes, I can see the sense in that,” said Arisha. “And now you’ve explained it I can see you are staying in character.”

“In what way?” asked Kerr, intrigued.

“You don’t do anything without a reason,” said Arisha. She hesitated. “I might as well be honest. I thought you were a disciplinarian for the sake of it. A power thing, if you like, but I can see now that I was

wrong. I agree with you, by the way. Disciplining Kataline would make things worse not better.”

“Indeed,” said Kerr, smiling. “A good manager needs to know when to be tough and when to back off and I like to think I’m a good manager. I try to be at least.”

“Which is all anyone can do,” said Arisha. “Can I come and look inside the hole as well? You’ve got me curious.”

“My first thought is no,” said Kerr after a moment’s thought. “My thinking being that the three most senior people here shouldn’t all go into a potentially dangerous situation but Kataline is also quite correct. I have little experience of Mars and none of bore mining or the equipment. I may well injure myself inadvertently and put Kataline at risk. On reflection I think it best that you do come with us.”

“Excellent,” said Arisha, beaming. “I’ll just go to the Medical room and put a kit together then.”

* * *

Although the outside temperature was minus 38 degrees the combination of orange sand, orange sunlight and the EVA suits’ internal heating created an overall effect not unlike that of a hot desolate landscape. The dunes and occasional whirls of dust thrown up by the thin wind made it similar to a tropical beach although the lack of palm trees and sea attested that it wasn’t. The full body suit with helmet, gloves and air tanks was also not the usual apparel for a day at the beach. All in all the mind was confused by the competing stimuli and sought familiarity, of which there was little. Even their transport was unlike any Earth based vehicle, although it superficially resembled a hybrid golf buggy and flat bed truck. The lack of weight contributed to the surrealness.

Nor did the mine look much like a mine. It was just a big hole in the ground with a wide metal lattice in the centre that protruded seven or eight metres up into the air. Four dirty metal struts that were embedded in the ground around the hole supported the central core and a fifth strut held a conveyor that led to a large rectangular

container that sat on a rail beside the hole. The rail itself continued past the hole, looped around and came back the other side. On both sides the rail stretched back the eighteen kilometres to the shuttle pads with containers sitting idle every half kilometre or so. Ordinarily the site would be noisy and filled with dust as the central core brought up its continuous stream of buckets of rubble and emptied them into the waiting container. Periodically, every half hour or so, the containers would all leap into action as the magnetic propulsion system shifted them forward to line up the next container. Now, though, the only dust was that being blown by the breeze over the edge of the hole or piling up against the sides of the containers. Overwhelmingly the site now had an atmosphere of activity lost; in many ways forlorn and sad, perhaps even pain. Like some prehistoric monster now dead but not yet rotten.

Kataline brought the transport to a halt beside one of the two large winches mounted on wheels. Each was covered with some sort of protective material that was held in place by a metal frame and they both sat, side by side, very close to the edge.

“We’re here,” she said unnecessarily as all three of them had been able to see the bore machinery for the last two or three kilometres.

“Interesting,” said Kerr, looking around.

“Not really,” said Kataline. “It’s just a hole in the ground with a big toothpick sticking out. Come on, but stay away from the edges. They’re liable to crumble and you don’t want to fall in. How much do you weigh?”

“About 85 kilos,” said Kerr. “Why?”

“Don’t let the lower gravity fool you,” said Kataline. “When you move around you feel like you only weigh 30 kilos but trust me, when you hit the rock at the bottom you’ll feel it with all 85 kilos of inertia. It’ll be like falling fifty metres on Earth and if you’re lucky it’ll kill you.”

“Thank you for that reminder,” said Kerr, staying well away from the edge. “What if I’m not lucky?”

“Most of your bones will be broken,” said Arisha. She went a little closer to the bore as she’d never actually seen any mining operation before, unlike Kerr who was used to oil rigs, but she too stayed well back from the edge. “How will we get down?”

“We’ll take the lift,” said Kataline, going over to the nearer of the winches.

She unclipped the protective covering and pulled it back. It flapped a little in the breeze but she secured it then unclipped the control panel cover. She flicked the power button and they all felt a mild vibration as the huge electric engine came to life. Kataline switched the winch over to manual and pulled the remote control from its retaining clip. She clipped it to the arm of her EVA suit.

“How come it’s working?” asked Kerr. “Shouldn’t its circuits be blown as well?”

“Gerhard fixed it when he came out,” said Kataline. “The other one’s not working though. We’ll fix it later.”

“Ah, right,” he said. “Of course. That’s how Gerhard got down inside the bore.”

“Yup,” said Kataline. “And, conveniently, he left the platform attached. That’s our lift.”

“We’re going down in that?” asked Arisha, eyeing the metal rectangle attached to the cable via a U shaped frame. As a safety precaution a single thin handrail was fitted at about waist height with a missing section that allowed them to get on.

“Fraid so,” said Kataline, getting onto the platform. “Don’t let go.”

Kerr made Arisha get on before he stepped on as well. It was decidedly cramped as the platform was intended for only two people and they each carried a powerful wide beam torch whose heavy batteries were strapped to their backs, above the air cylinders.

“A stupid question,” remarked Kerr, “but is the winch strong enough

for us all?"

"We use it to haul up the grinder," said Kataline. "Actually we use both at the same time to keep it balanced but they're each powerful enough to handle it on their own. We won't be a problem. Ready?"

"Yes," said Kerr, gripping the hand rail and well aware he was beside the missing section.

"We have lift off," announced Kataline melodramatically as she operated the remote and the platform jerked off the ground. It tilted to one side and Kerr shifted over to balance it better. The arm of the winch shifted sideways until they hung precariously over the yawning chasm of the bore. The sand around the bore, blown by the wind, drifted over the edges and gave the impression they were descending inside an orange waterfall.

"So this is how the engineers get down when there's a problem?" asked Kerr.

"Yes," said Kataline. "It doesn't happen often as we can repair a lot of things remotely using drones but sometimes one of the engineers has to go down to do something manually.

"Alone?" asked Arisha.

"Usually," said Kataline. "Although there's radio contact."

"Hmm," muttered Arisha, wondering what it would be like if she was alone and descending three kilometres down an almost finished bore. This was scary enough and she wasn't alone and was only going a hundred and fifty metres or so. Her respect for the engineers, already high, rose appreciably.

"Put your lights on," said Kataline a few moments later. "We're almost at the bottom."

"Look at this!" exclaimed Kerr as his torch lit up the side of the bore directly in front of him. "This is the dense layer, yes?"

“Yes,” said Kataline, bringing the platform to a halt.

“It's a sudden transition,” said Kerr, reaching out to touch the side. “Look, the softer paler rock suddenly changes to the darker denser rock. There's no mixing or graduation.”

“That's often the case,” said Kataline, playing her torch around. “One strata is deposited on top of another. It's only when liquids are involved that you get mixing.”

“Oh, I see,” said Kerr. He turned around. The central core machinery was mangled and twisted and sections of the belt that hauled the rubble to the top were strewn around. Everything was covered with a fine dust and more fell in a thin but continuous rain from above. Part way around the bore, roughly at ninety degrees to where their platform sat, was a dark shape that went across the shaft, a little to the side of the core, all the way to the wall. The nearer edge was ragged and large chunks were missing from the far side but the rest of the bottom of the bore looked to be relatively smooth.

“That'll be the hole, most likely,” said Kataline, pointing her torch light at the dark patch.

“Can I get off?” asked Kerr. “Is it safe?”

“Best not,” said Kataline. “We know the rock was ground thin by the grinder and it fell through over there but we don't know how strong the rest of the rock is. Stay on the platform. I'll shift it over.”

She operated the winch controls so the platform hung suspended over the hole, not without some toing and froing even though the hole was considerably bigger than the platform. It had jagged edges that Kataline didn't want to snag.

“Interesting,” she said, squatting down to peer at the nearest section of the hole's edge. “The underside is fairly smooth.”

“What does that mean?” asked Kerr, shining his torch inside the hole. He thought he could see something glint a long way down.

“I’ve no idea,” said Kataline. “Oh well. Right, let’s see how deep this thing is.”

She fumbled around the tool belt she wore around her waist and removed a laser measure. She pointed it directly downwards and pressed its button.

“One hundred and one metres, seventeen centimetres,” she said, looking at its readout. “Jesus, that’s a deep hole!”

Chapter Twenty Six

“Good God Almighty,” breathed Kerr as Kataline lowered the platform into the hole. “I don't believe it!”

Kataline brought the platform to a sudden halt three or four metres below the hole. All three of them played their torches around. In front of them were an unimaginable number of huge black columns that glistened in the torch light. That there was a distinct order to the columns was clear from the fact that, looking in certain directions, the lights shone uninterrupted so those were clearly diagonals.

“You think these are naturally occurring?” asked Kerr, reaching out to touch the nearest column. He couldn't as it was too far away and it was impossible to judge distances.

“Quite possibly,” said Kataline, although she was struggling to believe it. “They look to be crystalline.”

“But arranged in a grid?” asked Arisha. “Crystals only form grids if they're touching and these aren't.”

“And they seem to go all the way down to the bottom,” said Kerr, following a column down with his torch. “Hundred metre high crystals? I don't believe it.” He slowly brought his light up another column. “And there don't seem to be any imperfections. They look perfectly smooth.”

“Look up there,” said Arisha, directing her torch overhead. “Those look like the remains of some more of these columns.”

“I'd say they got smashed by the grinder when it fell,” said Kerr, studying the jagged remains. “It must have fallen through, smashed into the columns directly underneath and bounced into some others, smashing them as well.”

“I'd agree,” said Kataline, “which suggests that they're quite fragile which makes me wonder how they manage to stand up under their own weight, unless they're attached to the roof as well as the ground.”

"They must be," said Kerr. "Look there," and he pointed. "That looks like it might have been a recess in the roof where a column fitted. It was probably ripped out when the grinder fell."

"I confess I'm struggling to see how crystals could form like this," said Kataline, shining her torch around again. "If they're like stalagmites and stalactites what would have made them grow? There's no liquid here."

"So you think it was built by aliens?" asked Arisha.

"For sure it's not man made," said Kataline, shining her torch directly downwards. "Umm, do you want to go down to the bottom?"

"Yes," said Kerr.

"What if there's aliens down there?" asked Arisha, also shining her torch down.

"Ah," said Kerr.

He, too, shone his torch down and all three of them stood there, gazing downwards, hoping not to see any movement.

"I don't see anything," said Kerr, after a few moments. "Not even the grinder which should be down there somewhere. Do you think the aliens have taken it away?"

"More likely it's covered with rubble," said Kataline, "from the fall. It's difficult to tell since all this black stuff is quite reflective. Surely if aliens have taken the grinder away they'd have cleared up the rubble?"

"Maybe they're in the middle of doing that," said Arisha. "They heard us coming and left."

"It's a dilemma," said Kerr. "We won't know anything until we go down and we can't go down until we know more."

"Then we should go down," said Kataline firmly. "We can always come back up if there seems to be anything nasty."

“Mmm, maybe,” said Arisha. “Wouldn't it better better to send down a probe or a camera.”

“We didn't bring a probe,” said Kataline, “although I've got a camera. No rope though.”

“I still haven't seen any movement,” said Kerr. “I think we should go down and see what's there.”

“Me too,” said Kataline and pressed the down button on the remote.

“Don't I get a vote?” asked Arisha nervously as the platform started to descend.

“It's either two to one or unanimous,” said Kataline dismissively. “You lucked out, hon.”

She turned around, making the platform wobble, and studied the wall as they descended.

“This isn't rock,” she said, reaching out to touch the surface with her gloved hand. “It's smooth but not as black as the columns. Looks to be some sort of ceramic, maybe. Almost certainly not crystal.”

“And the wall's straight,” said Kerr, turning around as well. “None of the columns touch it either. I can't see an end that way although there seems to be an end the other way. Will your measure work over long distances Kataline?”

“Up to five hundred metres,” said Kataline. She stopped their descent and held her laser measure against the smooth wall so it was horizontal then pushed the button.

“Out of range,” she reported, glancing at its readout. “Let's try the other way.” She twisted it round to face the other way and glanced at the reading. “OK, thirty one metres.” She started their descent again.

“So it's over five hundred metres wide then,” said Kerr, “This ties in with the map.”

“What do you mean?” asked Arisha.

“If you remember the map I showed you,” said Kerr, turning round and peering downwards, “the bore was near a corner of the area of uniformity and we're only thirty metres from an edge which is probably a corner of the heptagon on the map. If this cavern is the same size and shape as the area on the map then this side wall is a little over a kilometre long.”

“So you're saying there's four square kilometres of columns here?” asked Arisha. She was probably frowning but it was difficult to tell with her helmet on.

“I'm not saying that,” said Kerr. “It could just be a coincidence and even if this cavern equates to the area on the map there's no reason to assume it's full of these columns. There could be plenty of other things down here as well. I don't know what the columns signify but they could all be clustered in this corner.”

“There looks to be a lot of rubble,” said Kataline, watching as the ground got closer. “You want me to go right down or stay up a little?”

“Is it safe?” asked Kerr.

“Probably,” said Kataline, slowing the platform's descent. “All I can see is a heap of rubble. Nothing's moving and you'd expect anything that's living down here to move out of the way at least.”

“Unless it can't see or hear us,” said Kerr. “If there was any light in here we'd have seen it through the hole before we came down. Maybe whatever it is lives in the dark and doesn't have ears.”

“If it's alive it must have some senses,” said Arisha. “If only to protect itself from predators.”

“Oh thank you for putting that image in my head, Arisha,” said Kataline tersely. “Now I'm thinking about predators as well as little green men.”

“Sorry,” said Arisha.

“It's far more likely that there's nothing here,” said Kerr as Kataline brought the platform to a gentle halt on top of the pile of rubble. “If there was it was almost certainly scared away by the falling grinder or by us.”

“Let's hope so,” said Arisha.

“And, it looks more or less the same down here as up there,” said Kerr, “apart from the rubble. I'm going down to the ground.”

“Take care,” said Kataline. “That stuff looks slippery.”

“I will,” said Kerr. He took a deep breath then stepped gingerly off the platform, keeping a firm grip on the handrail. A few lumps of whatever the black stuff was slipped down the side of the heap.

“It feels reasonably solid,” said Kerr and let go of the handrail. He stood for a moment then started to climb down the heap, testing his footing with each step.

“What surprises me,” said Kataline, “is that there are no massive pieces. You'd expect a falling column a hundred metres high to still have great big sections but nothing looks to be more than a few centimetres across. It seems to me more like the columns shattered, like they were made of glass or something. I'm coming down too.”

Arisha watched as Kataline made her way to the ground then, deciding she really didn't want to be left alone if the other two went exploring, she climbed down as well.

“Looks like quartz, only black,” said Kataline, picking up one of the larger pieces and inspecting it. “Feels quite heavy too. I'll take this back to the Base. We've got a spectrometer which'll tell us what it is.” She slipped the piece into the pocket on the leg of her EVA suit.

“The columns are seven sides as well,” remarked Kerr, walking around one of them. He ran a hand over its surface. “And it's smooth.”

“And here's the grinder,” said Kataline, pushing aside some of the rubble to reveal the edge of something that was clearly made of iron.

“Good. At least we know it wasn't taken away by aliens. I wonder if it's still in one piece?” She started to shovel shards of the rubble away with her boot.

“Don't go wandering off, Kerr,” said Arisha, noticing Kerr was a good fifty metres away, ambling along the corridor between two rows of columns. He was gazing upwards as though marvelling at the cathedral-like atmosphere they created. “It'll be easy to get lost in here if you lose sight of the platform.”

“True enough,” said Kerr. He stopped walking and turned to look back. “It's fascinating though, isn't it.”

“I wonder how they were put in place,” said Arisha, walking towards him and gazing upwards as well. “Assuming they were made and not formed naturally, how did they get them in the cavern and put them in position? It can't have been easy if they're fragile.”

“And why?” said Kerr. “Why would anyone create a huge cavern and fill it with columns like this? What purpose do they serve?”

“I doubt we'll ever know,” said Arisha, stopping beside him. “Not unless we actually do come across some aliens and ask them.” She laughed nervously. “Do you suppose if this was built by aliens they'd be that tall?”

“I doubt it,” said Kerr. “The gap between the columns is wide enough for us to walk between so I'd say they weren't that much bigger than us. Maybe a lot smaller and the gaps are like two lane highways. Have you noticed there's no dust?”

“Oh yes,” said Arisha. “No, I hadn't.” She bent down and wiped her gloved finger on the floor then inspected it. “No, nothing. Which is strange.”

“Yes,” said Kerr, looking around. “If this is what's left of a long gone civilisation you'd expect a lot of dust, if only leakage from the outside.”

“Yes,” said Arisha, standing up again. She reached out and touched

the nearby column. "So wh ... Whoa! Did you see that?"

"See what?" demanded Kerr, whirling around. "What did you see?"

"A flash of blue light," said Arisha, twisting round full circle.

"Where did it come from?" asked Kerr as Kataline stopped shovelling shards and looked over at them.

"It was all around," said Arisha. "It was only a flash."

"I didn't see anything," said Kataline. "Are you sure it wasn't a refraction of torch light through your visor?"

"It could have been, I suppose," said Arisha. "Yeah, that's probably what it was."

"I was just saying to Arisha that there's no dust," said Kerr as Kataline walked towards them.

"I know," said Kataline. "We're on radio, remember. I hear everything you say."

"Of course," said Kerr as Arisha reached out to touch the column again. "Can you think of any ..."

"There it was again!" exclaimed Arisha, jumping back from the column. "Did you see it?"

"See what?" asked Kerr, looking at her.

"A flash of light," said Arisha. "Only this time it was yellow. A sort of golden yellow."

"No," said Kerr.

"Neither did I," said Kataline. "What were you doing?"

"I just touched the column," said Arisha, putting her finger on the column again. "Like this. Oh!"

She stayed there, frozen, with her finger pressed against the side of the column. Slowly she lifted her finger off and stood there for a few moments, just staring at the column.

“What?” asked Kerr. “What is it?”

“I saw a beach,” said Arisha, her voice distant. “I just touched my finger on the column and it was like I was standing on a beach. A tropical beach.”

She reached out to touch the column again but Kerr knocked her hand aside.

“Don't touch it,” he said. “That's the third time you've touched it and the third time you've seen something.”

“That makes no sense,” said Arisha, stepping backwards. Out of reach of Kerr she put her hand against the column then snatched it away after a moment or two. “Oh my word!”

“What did you see?” demanded Kerr.

“I don't know,” said Arisha slowly, staring at her hand. “It was like I was in several different places at the same time. It was very confusing.”

“And it happens every time you touch a column?” asked Kataline.

“Seems to,” said Arisha.

“Interesting,” said Kataline. She touched the column she was standing beside and held her finger there for a few moments. Then she put her hand flat against the column.

“I'm not seeing anything,” she said, moving her hand to a different place. “Maybe it's just your imagination, Arisha.”

“I really did see things!” exclaimed Arisha. “Did either of you see them?”

“No,” said Kerr. “I didn’t see anything.”

“Neither did I,” said Kataline.

Kerr reached out and touched Arisha’s column then stood there for several seconds, transfixed.

“Interesting,” he said softly when he took his finger away. “I saw what looked like a galaxy, hanging in space.”

He put his hand against the column and held it there for several seconds before letting go and touching the column with just a finger.

“Very interesting,” he said. “When I held my hand against it I just got a lot of confused images, overlapping, just like Arisha. When I use a finger I just get one image. At least, not a single image. A coherent one but moving. Like a video.”

“Let me try,” said Kataline, going over to the column. She touched it as well then stood there with her finger pressed against the column. “Jesus!”

“What do you see?” asked Kerr.

“The Earth,” said Kataline. “Fairly close up. I can see clouds moving and, ohhh, what looks like several satellites slowly moving across. It’s dark on one side and I can see city lights. Bloody hell.” She took her finger away and shifted round the column so she could see Kerr and Arisha. “Do you suppose that was in real time?”

“You mean this is watching Earth?” asked Kerr.

“Well, it must have been,” said Kataline. “It certainly looked like Earth. How else would a video of the Earth have got inside that ... that ... thing,” and she pointed at the column.

“It could be an old recording, I suppose,” said Arisha. “Maybe from video broadcasts from Earth.”

“Not that old,” said Kataline. “I could see satellites.”

“So you're thinking this could be some sort of observatory, Arisha?” asked Kerr.

“I have no idea,” said Arisha. “But I definitely saw a tropical beach. It may not have been on Earth though.”

“And I saw a galaxy,” said Kerr. “But why all these columns if only one has these images?”

“Maybe others do as well,” said Kataline, marching three columns over. She put a finger against it and stood there for a few moments. “Oh.”

“What did you see?” asked Kerr.

“Nothing,” said Kataline. “It was just blank nothingness but I could hear a voice. It sounded human, almost like someone giving a speech but it was in a foreign language. I didn't understand a word.”

“Interesting,” said Kerr and touched the column himself. “Oh Jesus!” he exclaimed and wrenched himself away.

“Are you all right?” asked Arisha.

“Yes,” said Kerr. “That was ... horrible.”

“What was it?” asked Kataline.

“I was inside an abattoir,” said Kerr. “They were stunning the cattle then killing them. It was ... unpleasant.”

“But was it an Earth abattoir?” asked Kataline. “With real cattle?”

“Yes,” said Kerr. “Well, they looked real. Not aliens anyway.”

“Hmm,” said Kataline and walked back to the column she'd first touched. “I wonder why this one isn't giving me any images or sounds.” She started to run her hands over it.

“I'm smelling this one,” said Arisha, touching yet another column. “I

can smell fresh bread and jasmine.”

“Not a bloody thing,” said Kataline and moved over to the next column. “No, nothing here either. How about that one, Kerr?”

Kerr just stood there, not answering.

“Kerr?” repeated Kataline. Still no answer.

“Hey,” said Arisha, stepping over and pushing Kerr's arm. “Are you OK?”

“What?” asked Kerr, shaking his head.

“You weren't answering,” said Arisha. “Is everything OK?”

“Oh, yes, sorry,” said Kerr. He gave an embarrassed little laugh. “No, everything's fine.”

“What happened when you touched it?” asked Kataline.

“I got a feeling,” said Kerr. “Nothing else, just a feeling. Like something was inside my EVA suit and stroking me. It was actually quite nice. Soothing and perhaps a little erotic.”

“You're a sicko,” said Kataline with a laugh. “Let me try. Where were you touching?”

“Just there,” said Kerr, pointing.

Kataline put her finger on the spot then jumped back.

“Jesus!” she exclaimed.

“What?” asked Kerr and Arisha simultaneously.

“I was being sucked into what looked like a black hole,” said Kataline, peering closely at the column. “It was like my body was being stretched and ripped apart. You know, with the extremes of gravity as you get close to a singularity. That was nasty.”

“This one's back on Earth,” said Arisha, touching another column. “It looks like Sydney Harbour Bridge, or maybe it's the Golden Gate Bridge, I'm not sure which, and it's raining. I can feel the rain on my head and arms. I can smell something too but I'm not sure what. It's biting a bit in the back of my throat.”

“Are there any vehicles on the bridge?” asked Kerr.

“Yes,” said Arisha, looking around. As far as she was concerned the cavern with the columns didn't exist anymore. She was actually standing on the bridge near a toll booth with vehicles driving past with their windscreen wipers going. “They look like those things you see in old movies. You know, before they started using computers and AI to make proper movies.”

“Interesting,” said Kerr. “You know, that gives me an idea.”

“What's that?” asked Kataline.

“About what this place is,” said Kerr. “You don't suppose it's some sort of computer, do you? An alien one where they store the data inside these crystal columns rather than on magnetised chips?”

“You mean like a data centre or something?” asked Arisha, taking her finger from the column.

“It would have to be,” said Kerr. “Look at how many columns there are and how big they are. There must be a huge amount of data stored in these things.”

Kataline whistled and looked around.

“Let's just hope it's not an AI system,” she said. “Alien's bad enough but alien AI? The mind boggles.”

Chapter Twenty Seven

“Just put them anywhere,” said Kerr as Sasha and Aisley brought all four seats from the Rec Room into the Control Room. Arisha followed with the one chair from the Medical Room and Kataline appeared a few moments later with a stool from the Gym.

“Are we all here?” asked Kerr, looking at Kataline as the staff moved the seats around and made themselves comfortable. There was a mixture of puzzled and expectant expressions.

“Umm, no,” said Kataline, looking around. “Computer, where is Anders?”

“Exiting the lift,” said the computer.

“He’ll be a few moments,” said Kataline.

“OK,” said Kerr and turned to the main view screen on the wall. “Rikki, can you hear me?”

“Loud and clear, Kerr,” said Rikki. “We’re all here.”

“Excellent,” said Kerr. “Computer, enable privacy protocols on Mine Base Control Room, Orbiter Control Room and Base Orbiter communications link.”

“Enabled,” said the computer. The view screen went blank for a moment then revived with an image of a padlock in the top left corner.

The tension in the Control Room increased appreciably as the significance of enabling privacy sunk in.

“Sorry I’m late,” said Anders, bustling in. “Have I missed anything?”

“No, we were waiting for you,” said Kerr. “Take a seat.”

Anders grimaced when he saw the only remaining seat was the stool but he went over and perched himself on it anyway. He looked around

and frowned.

“What's going on?” he whispered to Aisley.

“I'm ... not sure,” muttered Aisley and Kerr frowned at them both. He remained standing as they were one seat short.

“Thank you all for coming,” said Kerr, sounding a little formal. “I'm having this meeting of all staff, Base and Orbiter, to update you all on the present situation.”

“Can I ask why you've enabled privacy protocols?” asked Tariq. “Is this a security issue and if it is why am I only now being informed? I am the security officer, after all.”

“Ahh, yes,” said Kerr. He looked at the floor for a few moments. “It's not a security matter as such it's just that, well, something has arisen and I don't particularly want it logged nor Head Office informed as yet. Not until we've discussed it and reached a consensus.”

“That in itself is a breach of security,” said Tariq, frowning. “It carries overtones of mutiny and I shall have to log this meeting as such in my Security Log.”

“Oh I think that's going a bit too far,” said Kerr, looking up sharply. “There's no question of mutiny here and we're not a military establishment anyway. We simply have a, umm, an unusual situation and I feel it best we discuss things and decide how to proceed before notifying Head Office.”

“Can I ask why?” asked Tariq.

“A perfectly reasonable question,” said Kerr. “I would prefer at this time, however, to wait until after I have appraised you all of the situation. When you are fully aware, Tariq, you may well want to reconsider.”

“This sounds ominous,” said Tariq, “but I'll wait. You appreciate I'm only doing my job?”

“Indeed,” said Kerr. “And I commend you for that. Now, if I may get started?”

Tariq nodded.

“Thank you,” said Kerr. He paused and looked around. Everyone was silent and focused entirely on him. “As you know, the Base experienced a sudden and serious failure of many of the electrical systems and investigations showed that the grinder had apparently come loose from the central core after falling into a hole some one hundred and fifty metres below the surface. As you all know, Arisha, Kataline and I went to the bore to investigate the hole further. What we found was rather astonishing. Computer, display Cavern1 on main view screen and the Orbiter view screen.”

“Jesus!” someone exclaimed as everyone leaned forward to look at the image of the rows of black columns.

“Indeed,” said Kerr. “It was quite a surprise. What isn't apparent from the image is the scale of the cavern. We haven't yet been able to explore it fully but indications suggest that it covers an area of some four square kilometres and is slightly over a hundred metres deep. As to whether these columns fill the cavern or not we don't know. Computer, display Cavern7 on both screens.”

He stepped over to the screen.

“As far as we can tell, when the grinder fell into the hole it had created at the top of this structure, it smashed a number of these columns,” said Kerr. “What you see here is the rubble from those broken columns.”

“What are they made of?” asked Mindy, peering at the screen. “It looks to be some sort of glass.”

“Kataline?” said Kerr.

“Yes,” said Kataline. “I brought back a sample of the material and analysed it with our mass spectrometer. It turned out to be quartz, of a form.”

“What do you mean, 'of a form'?” asked Mindy.

“That's what's interesting,” said Kataline. “Chemically it is silicon dioxide which is quartz but it differs in its atomic structure which accounts for its unusual weight. It's almost four times the normal weight of silicon dioxide.”

“Then it can't be silicon dioxide,” said Mindy flatly.

“Oh it is,” said Kataline. “It's simply that the thirty protons in each molecule are Xi protons which explains why they're so heavy. Xi protons are four times the weight of normal protons. The neutrons and electrons are, however, normal weight.”

“How is that possible?” exclaimed Gerhard.

“I have no idea,” said Kataline. “But it does tie in with something else. Kerr.”

“Yes,” said Kerr. “Roughly three and a half minutes after the grinder fell in the hole and broke the columns Parkes Radio Observatory picked up a burst of Xi waves coming from Mars. We think, that is Kataline, Arisha and I think, that that burst came from a release of Xi waves as the columns shattered. I haven't told Parkes about this as yet.”

“Excuse me,” said Efren, butting in via the screen. “Are you saying that there's four square kilometres of Xi based quartz columns not far from the Base?”

“That's exactly right,” said Kerr.

“Jesus,” exclaimed Efren, sitting back in his chair in the orbiter. “How'd they get there?”

“Well, that is yet to be established,” said Kerr. “There are a few more points you need to know. Firstly, the area of the cavern is, we think, a regular heptagon. Moreover, each of the columns that we've seen is also a regular heptagon in cross section and they appear to be lined up in parallel with the sides of the cavern. What happens near the

centre we don't know as we didn't explore that far. The columns may well fill the entire area but it's also entirely possible that there may be something quite different in the centre. Or anywhere else for that matter."

"Hold on," said Rikki. "Are you saying it was built by aliens?"

There was a sudden hush as people stopped quietly speculating with their neighbours and stared at Rikki then at Kerr. Then a hubbub began as everyone started talking to everyone else.

"Quiet, please," called Kerr, holding up his hands.

"This is absolutely a security issue!" exclaimed Tariq. "Head Office must be informed immediately!"

"In due course," said Kerr, placatingly. "In due course. Now, please, can I have your attention, everyone."

Slowly both rooms quietened down.

"It is possible," continued Kerr, "that columns of heavy quartz could have been created by natural processes ..."

"So you're saying it's not aliens?" asked Rikki, leaning forward.

"There's something else you need to know," said Kerr, glancing at Arisha and Kataline. "Umm, we discovered, um, after accidentally touching one of the columns that whenever we touch a column we, that is to say, all three of us, saw things."

"That's right," said Kataline, holding up her hands as the hubbub started again. "Mostly video sequences of things on Earth but also of other areas of the galaxy and possibly of Jupiter but we're not quite sure yet."

"So you are saying it is aliens then?" exclaimed Rikki.

"It's difficult to think of any other explanation," said Kerr.

“Oh my God!” exclaimed Rikki as everyone fell silent in stunned surprise at Kerr's admission.

“We think that the columns in the cavern are the storage banks for some alien data centre,” said Arisha.

“Are you serious?” demanded Gerhard.

“Yes,” said Arisha. “How long it's been there we've no idea but Kerr saw some images from what he thinks was the Vietnam War in the second half of the twentieth century.”

“It was similar to a movie I once saw of that war,” said Kerr.

“Are you saying it was the movie?” asked Gerhard.

“It could easily have been,” said Kerr. “Perhaps not the same movie but the data centre could have picked up the transmissions as the movie was broadcast on Earth.”

“So you don't think the ... thing actually was recording the war live in real time?” asked Arlo.

“I suppose that's possible,” said Kerr. “I'm no historian. I wouldn't know if the scene was a movie mock up or the real thing.”

“And I'm no historian either,” said Kataline, “but I'm fairly sure I saw a part of a speech by Ethan Millet. You know, that fascist dictator in the West who instigated the mass execution of non-whites just after the cyber wars of the early 2030s.”

“Hold it, hold it,” exclaimed Shanice. “Everyone calm down. Kerr, if you're right and this is a data centre, where's it getting its power? No data centre can operate without power.”

“Actually that's not entirely true,” said Tariq. “The columns are made of quartz, yes?”

“Yes,” said Kataline.

“Well, work has been done on Earth on storing data within crystals of glass using lasers operating on very short wavelengths,” said Tariq. “That technology is being developed as a way of permanently storing data without the need for power to keep refreshing the data before it degrades. If the columns are just repositories of old data then they'd need no power.”

“I don't think that's the case, though,” said Kataline. “One of the sequences I saw was of the three of us going into the hole using the winch. It was actually quite scary.”

“So are you saying there are actually aliens living inside the cavern?” exclaimed Rikki. “Are you serious?”

“That's very unlikely,” said Kerr, holding up his hands again as everyone started talking. “No indication of any form of life has ever been found on Mars. I rather suspect that the data centre is in fact an artificial intelligence data centre left here by some alien entities in the past and it's simply collecting data.”

“And I ask again,” said Shanice, raising her voice to be heard. “Where's the power coming from? It can't collect, process or replay data to you without power and if it's underground it can't be solar.”

“I don't know,” admitted Kerr.

“Perhaps there's some sort of chemical process,” said Anders.

“Oh Jesus!” exclaimed Aisley. “It's the palladium!”

Everyone stopped talking and stared at Aisley.

“She's right!” exclaimed Kataline, slapping her forehead. “Of course! I should have realised!”

“What are you two talking about?” demanded Kerr.

“The seam of palladium we've been following,” said Kataline, jumping up and walking around the Control Centre. “Palladium is an electrical conductor and the seam is an 18 centimetre diameter power cable! Of

course! That explains its consistency.”

“But where's the power coming from?” asked Arisha. “A cable doesn't generate power.”

“Isidis Planitia,” said Kataline. “The seam runs that way as well, towards Isidis Planitia. The crust is only four kilometres thick there so there's probably some sort of geothermal generator tapping into the magma.”

“But we cut that seam a year ago,” said Mindy. “There's no way power would still be getting through.”

“There must be other power lines,” said Kataline, stopping her pacing. “It would be foolish for whoever built this thing to only have one power line. They must have others for redundancy.”

“Unless they were so confident of their engineering they didn't need redundancies,” said Tariq.

“Hold on,” interrupted Arisha, scowling. “If we cut the seam a year ago the other power lines would have had to increase their power flow to compensate, yes?”

“Probably,” said Shanice. “Why?”

“It's just struck me,” said Arisha. “About a year ago a lot of us started having bad dreams, didn't we.”

“You think the two are related?” asked Kerr, frowning.

“They could be,” said Arisha. “Maybe the cutting of the palladium seam caused a power increase in the other cables and that generated some form of radiation that interfered with our brain waves at some level. It's well documented that radio and other electromagnetic waves can cause mental disturbances. They needn't be intense either. Just a small amount could impact brain waves during sleep.”

“What about Xi waves?” asked Kataline. “Could they do the same?”

"I have no idea," said Arisha. "I don't immediately see why not though."

"If that's the case," said Kataline, "then perhaps the additional power going through the other power cables could have generated an increase in the production of Xi waves and we'd never know as we don't monitor Xi waves. So you people on the orbiter have been having bad dreams as well?"

"Yes," said Kerr. "Hugh's were so bad he killed himself. He left a diary."

"This is absurd!" exclaimed Tariq. "How could Xi waves strong enough to reach the orbiter 17,000 kilometres away and cause bad dreams not have a profound impact on the people down here in the Base, only five kilometres away?"

"Ahh," said Kataline. "Good point." She dropped into her chair and scowled.

"Excuse me," said Aisley.

"Yes?" asked Kerr.

"It's just a thought," said Aisley. "Probably not a very good one though. A bit stupid really."

"That's fine," said Kerr. "I've always said the only stupid ideas are the ones no one talks about."

"Umm, OK then," said Aisley, confused.

"What's your thought, Aisley?" asked Arisha.

"Umm, I don't know about anyone else," said Aisley hesitantly, "but my dreams started a year or so ago but they've been getting worse. I just wondered, I mean, since we're talking about these Xi things and the mine and so on, well, ..."

"Keep going," said Arisha.

“Well, maybe it isn't the waves directly,” said Aisley. “Maybe it's what we've been extracting. After all, we've been mining closer and closer to this cavern thing and all the output goes past the base on the way to the shuttle pads. Maybe it's the Xi particles in that that's causing our dreams, not waves.”

“And that would explain ours,” interjected Efren. “We have thousands of tonnes of the stuff circling around the orbiter all the time.”

“You know, that could explain things,” said Arisha. “It could also explain why Hugh was affected more than anyone down here.”

“I'm afraid I don't see that,” said Kerr. “Why Hugh and no one else?”

“Perhaps he was just more susceptible,” said Arisha. “If he had a heightened sensitivity and there was a greater amount of the mine output around the orbiter than down here in the Base then it could account for why things went as far as they did.”

“Well, perhaps,” said Kerr, thoughtfully.

“And there's the constant depression and low morale,” said Arisha. “Having all that, I don't know, Xi-active material nearby all the time could be impacting us also all the time.”

“Wouldn't we all be getting more cheerful now it's stopped?” asked Kerr.

“No,” said Aisley, pleased her idea was being taken seriously. “The mine output is still there. Nothing's gone up since we shut down.”

“Actually Arisha could be right,” said Rikki. “We've had nothing come up in the last few days but we've still been sending what we had off to Earth. We've got no full containers up here now, just a few hundred empty containers and half a dozen freighters stacking up as they come back from Earth and all five of us are feeling happier. I was thinking about it this morning when I got up.”

“Well, that could simply be because you're getting paid time off work,” said Kerr. “You're more or less on holiday up there.”

“Well, I’m not,” said Shanice. “With Tariq down there my workload’s increased but I’m feeling happier too.”

“That’s probably because Tariq’s not here,” said Arlo with a laugh.

“You’re probably right,” said Shanice, laughing as well.

Tariq just curled his lip at them as Rikki, Efren and Zara joined in. Kerr gave a half smile and Arisha turned away so no one could see her face.

“So,” said Tariq. “Let me summarise. We have what we think may be an alien structure, possibly a data centre, possibly an AI data centre but almost certainly not manned or whatever you want to call it. We may also have a source of Xi particles and waves which may or may not be interfering with our brain waves. Is that about it?”

“That’s about it,” said Kerr.

“So I ask again,” said Tariq. “Why the security embargo? Is this not something Head Office should definitely know about? In fact, all of Earth? This is a matter that concerns everybody.”

“That was my first thought,” admitted Kerr. “As you all probably know, I am a company man and do things by the book so the fact that we seem to have fairly hard incontrovertible evidence of life elsewhere should be reported. Perhaps we don’t have evidence of life on Mars but certainly from somewhere else in the galaxy. That is something of great significance to everyone.”

“So why the embargo?” asked Tariq.

“Because when I thought about it,” said Kerr, “a few concerns were raised in my mind.”

“What concerns?” asked Tariq. “Surely it is vital that both the company and the people of Earth know what we have uncovered?”

“Well, perhaps,” said Kerr. “Or perhaps we should keep it quiet. That’s why we’re having this meeting.”

“Oh my God!” exclaimed Rikki suddenly. Everyone turned to look at her.

“What is it?” asked Kerr.

“There could be life on Mars,” exclaimed Rikki, throwing her hands up. “And we're planning on dumping our waste and polluting the whole planet!”

“Indeed,” said Kerr. “And that's not all. The question is though, what are we, the fourteen of us, going to do about it?”

Chapter Twenty Eight

“There's no need to do anything about it,” said Tariq. “We let Head Office know we've found something then shift the mining to another location well away from whatever it is. It seems quite straightforward to me.”

“That is certainly an option,” said Kerr, “and has the benefit of simplicity. Isn't it really just saying it's not our problem and walking away from it though?”

“But it isn't our problem, is it?” said Arlo. “At the end of the day we're a mining operation and we've just mined something. Let Earth know and carry on with our jobs. Like if we'd uncovered a giant diamond or something.”

“But it isn't just another mineral,” interjected Rikki. “It's evidence of life that isn't terrestrial. We need to get the mining shut down and the waste disposal project cancelled.”

“You seriously think Vanofov is going to do that?” said Arlo sarcastically. “All that investment wasted and for what? Some derelict old alien computer? There's a bloody great hole in the side. If there was anything living inside it'll be long dead by now.”

“Actually, that's a point,” said Efren. “It seems to be some sort of computer so there's going to be data inside. I can't really imagine what data aliens are going to have collected but I wouldn't be surprised if there's a lot of information about the other planets in our system, not just Earth. Maybe other solar systems, maybe even other galaxies and maybe there's a whole bunch of information about the things that created the computer and other life they've encountered.”

“Which is what concerns me,” said Kerr. “If we report this to Head Office what will they do?”

“Probably try to exploit it for profit,” muttered Aisley.

“What was that Aisley?” asked Kerr. “I didn't quite hear you.”

“I said probably exploit it for profit,” repeated Aisley. “That's what they do. Everything's about making money. The last thing they'll be interested in is alien culture and arts.”

“A distinct possibility,” agreed Kerr.

“So we tell Earth instead then,” said Tariq. “Let them worry about it.”

“Tell who?” asked Kataline. “A government? Won't they want to keep all that data to themselves? Even if they can't use it directly they'll want to keep it quiet so another government can't get its hands on it.”

“And it'll mean other companies wanting to exploit the data as well,” said Aisley. “Not just Vanofov. They'll probably end up fighting over it.”

“But surely we have a duty to Vanofov?” asked Mindy. “We work for Vanofov so isn't it our duty to tell the company what we've discovered? After all, we found it and it's in Vanofov's mining region. Surely Vanofov is entitled to reap the rewards?”

“And we might be up for big bonuses,” said Anders. “Maybe even be named as the discoverers. We'll be famous!”

“You sicken me, the lot of you,” exclaimed Rikki. “The corporations and governments have bugged up most of Earth and the moon and we're well on the way to destroying Mars as well. Give them the data about other planets and they'll screw them up as well. All in the name of profit and economic growth!”

“Actually I agree with Rikki,” said Zara. “I studied Economics before joining Vanofov and ...”

“Then surely you of all people would agree that Vanofov is entitled to a return on their investment?” interrupted Arlo. “Isn't that the basis of all economic theory?”

“Actually no,” said Zara. “It's the basis of conventional economic theory but not all. Someone did propose a different kind of economics seventy or eighty years ago which created a framework for sustainable

development that balanced human needs with environmental boundaries. I've forgotten what it was called but it was something to do with doughnuts. It never managed to get off the ground despite widespread support because the people in power didn't like it. Sustainability doesn't line their pockets whereas maximising growth regardless of the environmental cost is very profitable."

"Doughnuts?" exclaimed Tariq. "You want to base an economy on doughnuts?"

"It's a sweet idea," added Arlo with a grin. "Especially if they're filled with jam!"

"These are all good points," said Kerr, "and they reflect my concerns which is why I haven't already reported this to Head Office. Yes, I can see that Vanofov has a right to benefit from their investment and also that the people of Earth also have a right to share in the knowledge and potential benefits that this discovery could bring but on the other hand I am well aware that not everyone is honourable and there are very likely those who would try to exploit this for their own ends. Perhaps for money but has anyone considered the possibility that there may be details of potentially devastating new weapons in this data centre?"

"Or miraculous new medicines and treatments for diseases," said Arisha. "It is possible."

"Which would only be given to the highest bidders," countered Aisley.

"Indeed," said Kerr. "There's a lot of issues here. I propose we take a vote and see where we stand."

"A vote on what exactly?" asked Kataline.

"On whether to keep this discovery quiet or announce it," said Kerr. "And if we decide to announce it then who exactly we announce it to. Vanofov? NASA? The United Nations?"

"And how do we keep it quiet?" asked Tariq. "We'll all have finished our tours in the next eighteen months or so and other people will be

sent up. Sooner or later this area will be mined again and someone else will re-discover it. Maybe questions will be asked about why we didn't report it. Have you thought of that?"

"We could always destroy it," said Anders. "We've got plenty of hydrazine. We could pour it down the hole and blow the whole place up."

"That's just a typical male reaction," exclaimed Rikki. "Destroy what you don't understand."

"I was only joking," said Anders apologetically. "I didn't mean it."

"You know," remarked Arisha. "This meeting reminds me of a cell. It started off small and simple and it's rapidly growing into something very large and complicated."

"Let's hope it's not a cancer cell that kills us all," said Rikki caustically.

"Enough," said Kerr. "Let's just have a vote and take it from there. All those in favour of keeping this discovery to ourselves raise you hands ... OK, Rikki, Efren, Zara, Aisley so that's four. And those in favour of releasing the news ... ahh Tariq, Arlo, Sasha, Mindy and Anders. So that's five which means we have four undecided. Is that right Kataline, Arisha, Shanice, Gerhard?"

All four nodded.

"I want more time to think about it," said Kataline. "It's a complex issue."

"And that's only thirteen," said Tariq. "There's fourteen of us. You've missed someone."

"That was me," said Kerr. "I haven't voted yet."

"So vote," said Tariq.

"I do have concerns," said Kerr, "which is why I called this meeting

and on balance I'm voting to keep the discovery secret.”

Tariq burst out laughing.

“Great,” he said. “Five one way, five the other way and four sitting on the fence. Ain't democracy wonderful!”

“I think we should all sleep on it,” said Arisha. “As Kataline said, it's a complex issue and we shouldn't rush into a decision. Why don't we all think about it and perhaps reconvene in, say, twenty four hours?”

“Actually that's an excellent idea,” said Kerr.

“And in the meantime we could send one of the inspection drones to explore the cavern further,” said Kataline. “They've got cameras.”

“That's a good point,” said Kerr. “It'll save us getting lost among all those columns. The computer could track the drone and bring it back along the same path. Tell me, is it possible to modify the camera so it picks up Xi waves?”

“That I don't know,” said Kataline. “You engineers, can that be done?”

“I think so,” said Shanice thoughtfully as the other engineers shook their heads. “The drone cameras are fairly basic but we've got some considerably more sophisticated imaging equipment up here on the orbiter than you have in the Base. It should be possible to modify the digital sensor array in one of them. I can try if you want.”

“Then make that a priority, Shanice,” said Kerr. “You can send the modified camera down by shuttle.”

“OK, Kerr,” said Shanice. “I'll get onto it now.”

“Excellent,” said Kerr. “Shall we say the same time tomorrow?”

* * *

“And here we are again,” said Kerr brightly once the privacy protocols had been enabled on the connection between the Base and the

Orbiter. “Thank you all for your patience. Ideally we'll be able to reach a unanimous decision but a majority would be a useful way forward.”

“Actually, you're the Manager here,” said Efren. “Isn't it really your decision? That's what you're paid for, isn't it?”

“I wondered about that myself,” said Kerr. “Certainly in all operational matters, yes, I make the decisions or delegate them but this isn't what I would call a normal operational matter. The implications are quite profound. This isn't simply a matter of 'wow, look what we've found'.”

“OK, fair point,” said Efren. “It is a pretty big wow factor though, isn't it. Aliens! That didn't really sink in until quite a while after yesterday's meeting.”

“Indeed,” said Kerr. “And on reflection I probably shouldn't have sprung it on you all so quickly. Still, what's done is done. Can I ask, has anyone changed their minds now that you've all had a chance to think about it and come to terms with it?”

“Actually I have,” said Mindy, hesitantly. “Umm, I went to bed soon after the meeting. It was all a bit much and I needed to lie down for a while.”

“Entirely understandable,” said Kerr. “So you now think we should keep this discovery to ourselves?”

“Well, I had a dream,” said Mindy. “I'm, well, I'm feeling a little embarrassed talking about it but I dreamt about the Earth I've seen in old documentaries. You know, forests of trees and beautiful lakes and wild animals everywhere. It was so beautiful then but we haven't really got any forests left and the lakes, well, they're pretty polluted now. When I woke up I realised that we'd done that ourselves. I mean people generally, not us here at the mine although now I've said that I guess it's us who are mining who've done these things. Anyway, I don't know what other worlds are like but I think it would be a shame if we mess them up as well.”

“It's funny you should say that, Mindy,” said Anders. “I dreamt about nuclear bombs and those big mushroom clouds that covered huge areas. I know there's only been those two nuclear bombs that have actually been dropped but the effects lasted for decades. In my dream we were dropping these bombs on another country. I didn't like that. Then it suddenly changed and I was in the boardroom of some large company and the people on the board were voting to end the bombing and rebuild what had been destroyed. It made me think that things could change if the people at the top decided they wanted to.”

“Interesting,” said Kerr. “So you're both changing your vote?”

“I am,” said Sasha. “I had a dream as well. It was a little like Mindy's except that I didn't dream about forests and lakes. I dreamt about the spreading deserts in Africa and Australia which are being caused by global warming. Even though people have been banging on about fossil fuels destroying the ozone layer and dumping carbon in the atmosphere for well over fifty years the trillionaires and billionaires who control it all aren't doing anything about it. When I woke up I understood what Aisley was getting at. Those people will just exploit the alien data for themselves, not for the rest of us.”

“Hold on a minute,” said Kerr, frowning. “All three of you had dreams which changed your minds?”

“Actually four,” said Tariq. “It was probably what someone said about devastating new weapons but I had a dream in which an alien spacecraft was systematically wiping out all of humanity with some sort of ray gun then I found I was actually on the spacecraft and it wasn't aliens. It was people and they were betting with each other about who could kill the most people. It was really quite bizarre. Horrible, too.”

“Did you have a dream as well, Arlo?” asked Arisha.

Arlo nodded.

“Would you like to share it with us?” she asked quietly.

“Do I have to?” he asked.

“No, of course not,” said Arisha. “Only if you want to. Did you change your mind though?”

“Yes,” said Arlo.

“Did anyone else have dreams last night?” asked Kerr.

“I did,” said Rikki, “but it was a perfectly nice ordinary dream where I met this really awesome guy and we ...”

“Yes, I don't think we need to know the details,” interrupted Kerr quickly.

“I'd like to hear the details,” said Efren, grinning. “Was it me, Rikki? Tell me you were dreaming about me!”

“God no,” exclaimed Rikki. “As if!”

“I was flying,” said Arlo quietly. “I was flying over a field of what looked like wheat then all the wheat shrivelled and died then I found I was flying over what looked like a big chemical plant and I started to rise up in the air. That was when I saw that everywhere around the plant was desolate and dead and the air was dirty blue with toxic gases then I started to drift out into space and I could see the entire planet was desolate. Then a huge great thing appeared in the sky and the blue gases started to dissipate and things started to grow again.”

“That happened in my dream too,” said Sasha, sitting upright. “I remember now. The big thing suddenly appeared and started spraying something up into the sky and clouds started to form then it began to rain and plants started to grow again. I remember a big puddle formed as well and I could see fish in it.”

“Did that happen in your dream as well, Tariq?” asked Arisha. “Did anything happen that changed things?”

“I don't think so,” said Tariq, frowning. “If it did I don't remember. I did wake up with a strong feeling that it doesn't have to be like this though. That something could be done to change things.”

“I am absolutely fascinated by this,” said Kerr.

“So am I,” said Kataline. “All five who voted to tell Vanofov about the data centre had dreams about bad things to do with exploiting the environment and destroying both our world and other worlds.”

“It goes further though,” said Kerr. “All of them had good outcomes, even if it was, as Tariq’s was, just the idea that things could be different.”

“That’s the power of autosuggestion,” said Kataline. “That’s the sort of thing Rikki and others were talking about. I’m not sure it means anything though.”

“You think?” asked Arisha. “We’ve all been having bad dreams for months and now suddenly, after uncovering that thing, some of us, the ones arguing to keep its discovery quiet, are having good dreams and the ones arguing to give the discovery to one of the biggest capitalists on the planet are having dreams about how things could get worse and that change is possible. Don’t you think that it could be more than autosuggestion?”

“What are you getting at, Arisha?” asked Kerr as Aisley twisted to look at her control panel displays.

“Well, if it was autosuggestion wouldn’t you expect at least some of the people who voted to keep it quiet would have dreams that changed their minds?” said Arisha. “Autosuggestion would work both ways I would think.”

“We haven’t heard from everyone who voted to keep it quiet,” said Kerr. “Only Rikki.”

“Then let’s have another vote,” said Kataline.

“OK,” said Kerr. “All those in favour of keeping the discovery quiet?”

One by one everyone raised their hand. Surprised, Kerr raised his as well.

“Well,” he said, his surprise showing in his voice. “That's fairly convincing. I don't quite know what to say.”

“Excuse me, Kataline,” said Aisley, looking up from her display with her hand still raised. “I'm getting seismic waves.”

“What?” exclaimed Kataline, getting up and hurrying over to look at the displays herself.

“Is the floor vibrating?” asked Kerr. “I didn't think the mining was starting up until tomorrow. Why would it have started vibrating?”

“We're not mining,” said Kataline, tapping screens and scanning the displayed data. “I don't think it's an earthquake either. The wave pattern's all wrong.”

“What do you mean, all wrong?” asked Kerr going over to look as well even though the data meant very little to him.

“The seismic waves are too focused,” said Kataline. “It's like they're coming from one location rather than along a fault line.”

“Where?” demanded Kerr.

“Umm, south west,” said Kataline. “I can't get a distance without triangulation but it seems to be originating from ... Oh Jesus!”

“What?” exclaimed Kerr as the others watched with growing alarm.

“It's in the direction of the bore,” said Kataline. “The alien thing. What the hell is happening?”

The Control Centre started to shake quite noticeably and a coffee cup on the end of the console toppled onto the floor.

“Aisley, get a drone in the air,” snapped Kataline. “One of the ones at the bore. I want a visual.”

“On to it,” said Aisley, shifting over to another console. She started tapping on the screen. “In the air. Visuals on main screen ... now.”

Everyone except Aisley turned to look. Aisley had her own small display and was controlling the movement of the drone.

“Oh my word!” exclaimed Arisha, putting her hands to her face as the screen showed the ground breaking up.

“Where is that?” demanded Kerr.

“Just beyond the bore,” said Kataline. “That's it there,” and she pointed to a small black dot on the edge of the crumbling ground.

“What's happening down there?” asked Rikki, her voice echoing although she couldn't be seen behind the drone's display.

The shaking of the Control Room got worse and Kataline stumbled. Kerr lurched over to help her up but she pushed him away. The others were holding onto their chairs and Aisley was gripping the side of her console.

“Jesus!” exclaimed Gerhard. “Look at that!”

A section of the ground beside the bore started to rise vertically into the air.

“Pull the drone back, Aisley!” shouted Kataline, still on her hands and knees. “Get a wide angle view!”

A moment later the ground receded dramatically and they could all see a massive seven sided section of the ground rise up. Huge chunks of rock fell away from on top as the shaking in the control room subsided then died away completely.

“Bloody hell!” exclaimed Rikki who was watching from up in the orbiter. “What is that?”

“It's the aliens,” said Kerr, staring at the screen as he edged back to sit in his chair. “The thing is taking off!”

“Ya Allah!” exclaimed Tariq as Sasha started to hyperventilate.

The septagon continued rising, shedding rock, until it was some way off the ground then tilted upwards and started rising faster. What rock remained on top slid off and they all imagined they heard it crashing to the ground. Turbulence started to bounce the drone around.

“Keep it steady,” shouted Kataline, standing up.

“I’m trying,” shouted back Aisley, “but it’s ...” The screen went blank as a hundred tonne lump of falling rock smashed the drone into oblivion.

“Rikki,” called Kerr. “Can you get a visual on the mine from up there?”

“No,” said Rikki. “You’re too far away. I’m getting something on the radar though. Jesus, it’s moving fast.”

“What direction is it heading in?” asked Kerr.

“I’ll be able to get a trajectory in a minute,” said Rikki. “It’s speeding up though. It just passed the orbiter!”

“Are you safe?” asked Kerr, trying to visualise the septagon hurtling through space.

“Um, it missed us by about three thousand kilometres,” said Rikki. “I didn’t have time to get visuals though. Umm, it’s doing approximately five hundred thousand metres a second already. I’m working on the trajectory now. Oh fuck!”

“What?” exclaimed Kerr, gripping the arms of the chair so tightly his knuckles were turning white.

“It’s heading for Earth,” said Rikki, her voice shaking. “I’m double checking the figures.” Everyone held their breaths. “Yes, I can confirm it’s heading for Earth.”

“Estimated time of arrival?” snapped Kerr, staring sightlessly at the blank view screen.

“Impossible to say,” said Rikki, her voice strangely calm now. “It’s still accelerating. I’m guessing hours rather than days. That thing’s making our freighters look like push carts.”

“Kerr,” called Aisley. “Do you want me to send an alert to Earth?”

“What?” asked Kerr, twisting to look at Aisley. “What was that?”

“Do you want me to send an alert to Earth?” asked Aisley again.

“What can they do?” asked Arlo. “We’ve got no technology like that. They’re helpless.”

“They’ve got a lot of nuclear warheads,” said Tariq. “They might be able to blast it to pieces.

“Give me a moment,” said Kerr, taking a deep breath and forcing his brain to think calmly. “It may not be attacking. It’s been here on Mars for God knows how long. Why would it attack now?”

“Because we attacked it,” said Tariq. “We smashed some of its columns.”

“Then it would attack us, surely,” said Kerr. “Why head for Earth?”

“It may not be heading for Earth,” said Arisha. “It may be just heading in that general direction.”

“Rikki,” called Kerr. “Is the trajectory changing?”

“Uh, no,” said Rikki. “And it’s passed the million metres a second mark and still accelerating.”

“I see,” said Kerr. He sat back in his chair and closed his eyes for a few seconds. “There’s an interesting coincidence here. The craft, which I suppose it now obviously is, took off just after we voted unanimously to keep it quiet. Why would it do that?”

“You think it knew?” asked Kataline.

“I rather suspect it did,” said Kerr as Rikki reappeared on the view screen. “I wouldn't be surprised if it also somehow created the dreams. Do you suppose it was trying to tamper with the voting?”

“Why on Earth would it do that?” asked Kataline, surprised.

“You know, a funny thought just came to me,” said Kerr. “Arlo and the others had dreams in which bad things happened but then something came along to change it and make things good again. You don't suppose that the craft was trying to tell us that it is able to put things right?”

“If it can why would it bother with our little vote?” asked Arisha. “If it's that powerful why not just go ahead and do it?”

“Maybe it really is just a computer,” said Rikki. “Maybe it needed an instruction, you know, permission or something.”

“Do you want me to send an alert to Earth?” asked Aisley again. “We should warn them, shouldn't we?”

Kerr stared at Aisley for a few moments then looked at Rikki then Arisha then back at Aisley.

“No,” he said quietly. “The die is cast. Let's just hope those dreams come true.”